Notes

UNIT- I CONCEPT OF EDUCATIONAL TECHNOLOGY

STRUCTURE



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1.1 INTRODUCTION

Educational technology is a systematic application of relevant technological processes and resources in teaching, with a goal to improve students' performance. It involves a disciplined approach to identifying the needs of students, applying technology in instructions, and tracking their performance. A thickly populated country like India where mass education is the demand of the time, only educational technology is advisable. Software programme like programmed learning material can make mass education easily available. According to the intellectual level of the learner different programmed material like linear, branching, mathematics can be applied. Almost all types of courses considering the age level of the student can be programmed. Educational Technology possesses great potential for teaching learning process. It makes curriculum construction and selection of teaching-learning strategies easy and also makes teaching-learning more effective.

Educational Technology helps in improving quality of teaching by providing varied types of programmes through TV and other media. Educational Technology motivates children for learning. It augments motivation among the learner to learn by using various new machines such as video, computer tape recorder, TV, and other different types of projected aid.

Educational technology almost eliminating the obstacles of mass instruction. Different types of programmes developed by different experts for a large population of students can be easily communicated educational opportunities accessible for all: It breaks the barrier of all classes of learners, irrespective of economic, social or geographical stat as and makes education available for all. For example, through mass media, TV, Radio, Film etc., it makes education easily available for all. It also serves as distance mode of learning.

Education Technology makes provision for self-instructional materials, which provide opportunities to both the gifted and backward children to proceed at his own rate of speed in the learning process.

1.2 OBJECTIVES

After going through this unit, you will be able to:

- explain the concept of Educational Technology
- realise the importance of Educational Technology
- understand the principles of Educational Technology

1.3 MEANING, NEED AND SCOPE OF EDUCATIONAL TECHNOLOGY

1.3.1 MEANING OF EDUCATIONAL TECHNOLOGY

According to J.K. Galbraith there are two main characteristics of every technology. These two characteristics he mentioned in his book "The New Industrial State" as systematic application of scientific knowledge to the Practical tasks and the division of the practical tasks into sections and sub-sections. He views that any subject in the field of education which fulfils these two norms of characteristics, is called educational technology.

Secondly, it selects or designs the best plan to teach the learners so that they can achieve the teaching objectives. In the third stage by evaluating the output of the learner it is observed whether the teaching objectives have been achieved by the learner or no. If the teaching objectives cannot be achieved by the learner then there arises the need of changing the teaching strategy or strategies in the manner through which teaching objectives may be achieved. Thus the process of educational technology may be divided into three different stages

i. In the first place its function is to analyses all the components which are to be applied as input in the teaching learning processes;

ii. In the second place the components which are used in the teaching learning process during input and output are searched and analysed in group or individually,

iii. In the third place the learning experiences acquired in the teaching - learning process should be in the form of research-outcomes.

From the above discussion /it may be said that educational technology is a Behavioral Technology which presents the art of teaching in a new fashion with controls the educational influence with the help of (1) teaching objective (2) contents, (3) teaching material, (4) educational environment, (5) behavior if the pupils, (6) behavior of the teacher, and (7), interaction between teaching and pupils. As such educational technology is a dynamic, progressive and important mechanism in the field of education. It modifies and analyses the various steps of teaching and learning with inspiring principles and laws of modern psychology, sociology, engineering, administrative theory, mathematics another social and physical science. It develops educational efficiency of formulating new process of education according to the need of the learner by remodeling the whole system of education considering the necessity of the learner. Besides, classroom, educational technology plays an importance role in the entire school environment, educational administration and educational references.

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1.3.2 NEED OF EDUCATIONAL TECHNOLOGY



The Educational technology has great importance in a thickly populated country like India where mass education is in great demand with limited resources. Educational technology is a major requisite for formal, informal as well as for non-formal mode of teaching-learning. The needs of Educational Technology are discussed hereunder;

1. Radio as a media of educational technology broadcasts educational programme throughout the country. Education programmes include local needs; adult education etc can be broadcasted through radio.

2. Television as a media of education telecasts different lessons and educational programmes related to formal and non-formal education in the country. Various types of scientific innovation; discoveries, strangers of wildlife and various fields of knowledge are generally bringing forward to the masses through television. Satellite service and various activities of different planets and the advantage of satellite services all are now within easy reach for the Indian mass although they are in remote area.

3. Educational technology is concerned with the high demand of training a retraining- the school and college teachers economically and effectively. Educational technology serves the purpose of in-service teacher training course through mass-media; the multi-media package developed by NCERT remove the barriers of in-service teacher training problem. The technology used in the training programme of the teacher are generally microteaching, simulated teaching, team teaching,

teaching models etc. along with some necessary innovative concepts.

4. Distance education method of our country mostly follows the technique of educational technology. It uses the collaboration of media for instructional purpose. It provides the facilities at any time and at any place and for all persons.

5. Systematically developed and well planned open and distance education courses provided by a number of Universities in our country are the products of educational technology. Some of the courses of intermediate or higher secondary level can also be imparted through distance mode. Another important step of educational technology is the idea of establishment of open school where instructions are imparted effectively through specially prepared lessons, study centers, local counsellors and tutors and through some holiday courses.

6. Audio-visual aids are considered as effective media for teaching and learning. These are the products of educational technology and are getting much importance in India now. As these are mechanical devices they need preparation, development and skillful utilization. The sophisticated machinery devices require careful handling. There is a department of teaching aids in NCERT who is producing material and testing the effectiveness of these materials by conducting survey research and evaluation. This department also provides guidance and service to the educational institutions regarding the use and appliances of these teaching aids.

7. Educational Technology renders immense help in the teaching and learning of languages. Present audiocassette, audio CD etc. help in improving and removal of errors in voice. Devices like linguaphone, DVD are giving training for spoken languages. Thus educational technology contributes a lot to the functioning of the language laboratories to teach Indian and any other foreign languages like English, French, German, and Russian etc.

In our country educational technology is enjoying much more importance in the field of both formal and non-formal education by providing guidance, planning and by implementing and evaluating the various programmes of teaching and learning. Other general needs of Educational Technology are presented here;

1. Makes learning mobile, students can learn outside of the school walls and beyond the bell schedule.
2. It empowers students to learn on their own, follow their passions, create, innovate and build knowledge.

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3. It affords them a level of communication and collaboration never before possible. This has two major advantages:
    - It allows them to communicate with others not in their geographic location, opening up new perspectives;
    - It helps them develop team working skills, necessary in today's world where the problems are best solved by many minds working together.
4. Teaching is an art and students still need the guidance of their teachers. Technology actually enhances the art of teaching and the relationship between student and teacher by letting the student go over the material at home then bring his/her questions to the classroom and discuss, experiment, grapple, question, debate, dialog, test, revise and demonstrate learning in a social environment, rather than wasting precious class time with learning basic content.
5. Technology personalizes learning. Students who are struggling or advanced are generally ignored in the classroom. With technology, those students can receive content at their levels to prevent frustration but keep them challenged.
6. It saves the environment. Students no longer need to use paper. They can turn in all assignments digitally, read e-texts & digital books, and take notes on the computer.
7. Accessibility for special needs students. Features like audio books for the sight impaired, text to speech, speech to text, voice recognition software, and more make technology an invaluable tool for many.
8. Makes a variety of courses available to those who previously lacked access.
9. Helps students gain a global perspective. With technology, students can collaborate and communicate with experts and peers around the world, helping them escape the narrow perspective of one cultural lens, opening their minds to more creative thinking.
10. For students who live in remote areas and cannot easily find books, digital devices can become an instant library. They can check out digital books from their library or download books in an instant from online booksellers. This can happen anywhere in the world.
11. Takes them places they may never visit in person. Through virtual field trips, Google Earth 3D, the Art Project by Google and more, students can see and interact with art, architecture, and natural wonders that they could previously only read about.

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1.3.3 SCOPE OF EDUCATIONAL TECHNOLOGY

According to S.S. Kulkarni educational technology is the application of laws and recent discoveries of science and technology to the process of education. As the term 'education' includes teaching-learning instruction and training therefore the scope of educational technology is much wider. The teaching-learning principles, theories, human resources, material resources, teaching-learning strategies and mass-media etc are coming under the scope of Educational technology. The scope of educational technology may be summarized as below:

1. Selection of teaching learning strategies; Teaching learning strategies can be selected easily with the help of educational technology. It tries to

- i. give an idea of what is teaching,
- ii. Determine the essential features; of teaching process and their relations,
- iii. point out the changeable and flexible factors of teaching,
- iv. analyse the possible changes that should occur in teaching considering the different stages of the learner which are in a process of change or development,
- v. analyse the level of teaching, theories of teaching, principles of teaching, the concept of learning, how the theories of learning are connected with the actual activity of learning, the involvement of the teacher and the learner in the teaching learning process.
- vi. Produce a large unit of theories and principles of teaching-learning for achieving the optimum educational goal.

2. **Finding out clearly the educational goals and objectives;** Educational technology tries to find out the educational needs and aspirations of the community and the resources available in that community for the fulfilment of these needs and aspirations. It tries to clearly find out the broad educational objectives and analyse it in terms of the specific classroom objectives of teaching and learning.

3. **Development of the curriculum;** Educational technology tries to design the curriculum suitably for achieving the desired objectives. It tries to find out ways and means for the selection of suitable learning experiences or contents to meet these desired objectives. Its function is to find out suitable framework so that effective instruction can be given according to stipulated curriculum.

4. **Production and development of the teaching-learning material;** After designing the curriculum educational

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technology tries to produce and develop the suitable teaching-learning material in view of the specific objectives. In this stage educational technology tries to produce and develop new technique for preparing software material and instructional material like programmed learning material, computer assisted learning material, self-instructional material, preparation of the lesson plan which stimulates the teaching-learning situation.

5. **In the teaching-learning process** the teacher is the main controlling authority. As such educational technology makes arrangement to prepare teachers to face the responsibilities of teaching with perfectly trained knowledge. The training is imparted to the teacher through various technological media.

6. **Development and selection of teaching learning strategies**; Under this head educational technology tries to pave the ways and means for developing, selecting and devising suitable policy and procedure of teaching considering optimum learning outcomes. In formulating policy or strategies and tactics due attention must be given to teaching-learning materials available, different types of teaching methods available, appropriate devices and models of teaching. It tries to select the appropriate strategy from all these strategies to get the maximum benefit.

7. **Teaching-learning process can be made more effective through the use of audio-visual aids;** Selection of audio-visual aids must have relevance to the particular teaching-learning situation. It makes provision for developing the audio-visual aids and producing some new aids considering the available resources if necessary. With relevance to the problem faced in the teaching-learning process, manipulation of audio-visual aids is advised.

8. **Effective utilization of hardware and mass media**; The electronics devices play an effective role in the field of education for the attainment of educational objectives. These devices include various sophisticated instrument, equipment gadgets and communication devices. Educational technology tries to point out the specific function of these devices so that effective use can be made as mass media and as appropriate teaching-learning material in formal and informal education and in both individual and large scale situation. It helps the teacher and the learner in their respective task in the teaching learning process.

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9. **To work for effective utilization of sub-system of education;** As a whole a system is incorporating various sub-systems. For the application of technology it includes the topic details, its theory and principles, the process of education, its different sub-systems, their operations and process in terms of input and output, the needed development, output and function-ability of the system, the organization and management of the system in an effective way by specifying the respective roles of man, machine and media in relation to the purpose of teaching and learning.

10. **To provide essential feedback and control through evaluation;** Education technology exercises appropriate control over the process of teaching and learning. It plans and devices suitable tools for continuous evaluations of the process and products of the teaching-learning activities. Such evaluation can give appropriate feedback to the learners as well as to the teachers. On the basis of this feedback necessary improvement can be made both at the preparatory stage and at the implementation stage of teaching and learning.

Educational technology observes the whole teaching-learning function and organizes the ways and means of suitable evaluation technique, their planning, development, selection and appropriate use in relation to the objective to be achieved through teaching and learning.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

Fill in the blanks

1. Educational Technology helps to achieve the determined ----------------
2. Application of machines in ------------ of knowledge relates to Hardware Approach.
3. Technology of Education involves the -------------- of educational principles.
4. Application of Technology for instructional purpose is ---------

1.4 DIFFERENCE BETWEEN TECHNOLOGY OF EDUCATION AND TECHNOLOGY IN EDUCATION

Technology in education refers to application of engineering principles in the development of electro-mechanical equipments used for instructional purposes. This type of technology is known as ET –I or Hardware. Beginning with simple audio-visual aids, as popularly

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known in early 1960's, charts, slides, film – strips to the most sophisticated electronic gadgets such as radio, television, computer, videotext, videodisc and so on fall in this type of ET. Even before that, technologies such as paper, ink, and print were invented based on the principles of physical sciences and subsequently were used for educational purposes. Use of media in education including teaching – learning and educational management, has revolutionized the educational system all over the world. In the educational sector, there are three main contributions of media, viz., preservation of knowledge, transmission of knowledge and imparting quality education to unlimited number of students.

It should be understood that no medium is superior or inferior to one another, because every medium has its potentials and limitations. Depending on the educational capabilities of media, two or more media can be combined to achieve more complex objectives. Such an approach is known as multi-media approach.

Educational technology is also a process and a way of thinking about a problem. Substantial contribution of social sciences, specifically principles of psychology, operant conditioning of Skinner, etc. led to the development of ET. Technology of education refers to the detailed application of psychology of learning to practical teaching problems. The emphasis is on the scientific way of teaching – designing, structuring and implementing teaching to achieve well defined objectives. Consequently, a greater diversity of strategies are being used to meet diverse needs and learning types of students. This type of technology is also known as ET-II or Software.

The above two types of categories of educational technology supplement each other. Technology in education gave us a number of devices (media) with tremendous capabilities to facilitate the learning process of a given group of students. Technology of education suggests us the best way to use those media to accomplish specific objectives. Thus, Technology in education is a Hardware approach, whereas Technology of education is a Software approach.

1.5 DEFINITION OF EDUCATIONAL TECHNOLOGY

Educational Technology is behavioral approach to the teaching learning situation. "It uses the scientific technological method and the concept developed psychology, sociology, communication and linguist and other related field".

John.P.Dececoo defines Educational Technology, as "Education Technology is a form of detailed application of Psychology of learning practical teaching problems. According to Robert A. Cox "Educational Technology is the application of scientific process to men's learning conditions.

Kulkarni defines Educational Technology as "the application of the laws as well as recent discovering of science and technology to the process of education."

According to G.CT. Leigh "Educational Teleology is the application of scientific knowledge and learning and the conditions of learning to improve the effectiveness and efficiency of teaching and training.

Richmond defines Education Technology as "Educational Technology is concerned to provide appropriately designed learning situations which, holding in view of objectives of the teaching or training, being to bear the best means of instruction."

Takashi Sakamato defines Educational Technology as "Educational Technology is an applied or practical study which aims at maximizing education effect by 'Controlling' such relevant facts as educational purposes educational environment, conduct of student, behavior of instructors and interrelations between students and instructors."

Thus, Educational Technology includes both the hardware approach and software approach which is based on physical science and behavioural science.

1.6 MAJOR APPROACHES OF EDUCATIONAL TECHNOLOGY

According to Lumsdane Educational Technology can be classified to three distinct types on the basis of its multifaceted concept. These are

1. Hardware approach,
2. Software approach and
3. Systems approach.

1.6.1 HARDWARE APPROACH

From general conception it may be said the use-of engineering machine in the teaching-learning process. We must remember that the parents of educational technology are physical science and engineering technology. Hardware Approach is the application of physical and engineering technology in teaching –learning process.

Human knowledge has three aspects(1) preservation, (2) transmission and (3) development. The uncountable growth of knowledge and tremendous explosion population demand the use of mechanism in the field of teaching-learning process. Contribution of hardware approach in education can be summarized as follows:

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The mechanical and technical revolution has mechanized the teaching learning process and contributed a lot to reach the educational to the masses with great ease and economy.

It is not possible for a teacher to import knowledge to the masses or to the distant people but through mechanizing system of education surprising changes have occurred in the teaching-learning processes Thousands of people are benefited with this method of mechanizing system of education.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

Say True or false

5. The distance education method in India is associated with Educational Technology.
6. Educational Technology Eliminates the barrier of Mass Education.
7. Education Technology is the application of Scientific Laws and methods to the process of Education.
8. Educational Technology Exercises Control over the media method and teaching, learning environment.

1.6.2 SOFTWARE APPROACH

Software technology is a behavioral technology. Its origin to the behavioral science concerning psychology of learning. It may be named as instructional technology, teaching technology or behavioral technology. Software technology does not use engineering machines. Psychological principle of teaching and learning provides definite technology to bring desirable changes in the behavior of the pupils.

The software system is originated from the theories of learning developed by Skinner. This technology tries to produce a suitable teaching-learning material, teaching learning strategies, evaluation techniques etc. for obtaining maximum benefit in the teaching- learning process.

Software technology basically gives importance on developing and utilizing software materials like programmed material, teaching learning strategies etc., based on psychology of learning hardware approach generally importance is given on production and utilization of audio-visual aids, sophisticated instrument and gadgets and mass media for helping the teacher and learner so that better result may be obtained in the teaching-learning procedure. In software approach it tries to

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utilize psychology learning in preparing software materials, in designing teaching-learning strategic, tools of evaluation and in other devices of teaching and learning.

1.6.3 SYSTEM APPROACH

The third type of educational technology is system approach or system analysis. It is also known as management technology. It was developed after World War II. The origin of system approach technology is computer science. As such it has a scientific base. It gives a scientific base in designing, applying and evaluating the educational process to derive the desired specific educational objectives. System approach being scientific in its base helps to study the problems of educational administration and management in a more scientific, more economic and more effective way. It also helps in formulating scientific instructional outline. It is a systematic application of educational technology to the whole system of education, and considers the process of education from entry behavior to the terminal behavior as one whole. It incorporates all aspects and all parts of the whole system of education, such as pupils, teachers, curriculum, content, instructional materials, instructional strategy, physical environment and the evaluation of the best people at the best time and at the best price.

"The system approach in instruction-is an integrated programmed complex of instructional media; hardware and personnel whose components are structured as a single unit with a schedule of time and sequential phasing." If the system cannot function properly in achieving the desired objectives there is provision for using alternative strategies. Modification can be done by applying the most appropriate and feasible practices or strategies. In the system approach a continuous effort is made to modify the system through continuous comparison of different roles played by man, machine and media and to produce a right and proper, scientific instructional design to meet all the objectives outlined.

1.7 OBJECTIVES OF EDUCATIONAL TECHNOLOGY

Objectives of Educational Technology are presented in this sub section;

1. The first and foremost objective of educational technology is to systematize the teaching and learning \ methods and techniques in a modernized way. The main purpose is to bring more effectiveness in the teaching-learning process to meet the requirements according to the need of the changing era.

2. The second objective of educational technology is to bring desirable modification or changes in the behaviour of the teacher and pupils modifying the teaching, learning and evaluation system according to the need of the situation.

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3. The third objective of educational technology is to provide valuable help in the teaching-learning process so that best possible result can be-achieved in an economic way. It tries to make the classroom teaching easy.

4. Fourth objective of educational technology is to help human beings in their continuous progress by providing various facilities for solving the most complicated problems of their life.

1.7.1 Objectives of educational technology in view of the specific classroom teaching or Objectives at Micro level

1. To recognize the characteristics of the pupils and to analyse educational needs accordingly.

2. To decide after observation the specific classroom objectives and state them in behavioral term.

3. To analyse the content to be taught and arrange them in the order of sequence.

4. To find out the teaching-learning material and resources.

5. To pointout the nature of interaction among the students, teaching material, content of instruction and the teaching method.

6. To plan the series of materials to be taught to the student and use the available material resources for achieving the defined classroom-objectives.

7. To evaluate the effectiveness of the classroom teaching by testing the pupil’s performance or by observing the changes in behaviour pattern.

8. To give proper feedback to the pupil as well as to the teachers.

1.7.2 Objective of Educational technology in view of the broad educational goal or Objective at Macro level

1. To identify educational needs and intellectual aspiration of the community.

2. To find out broad strategies and structure of education for obtaining these particular goals.

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3. To develop a suitable curriculum with interaction of science, art and human values.

4. To develop some teaching-learning models to improve the process of educating the child.

5. To select and to develop the appropriate aids and equipment to meet the desired goals or purpose.
6. To identify major objectives and to find out ways and means to overcome them.

7. To provide educational opportunities to the mass especially to the neglected sectors of community.

8. To manage the whole educational system i.e., the planning, implementation and the evaluation phase.

1.8 EDUCATIONAL TECHNOLOGY AS A SYSTEM

The systems approach to the design and analysis of teaching / training situations is the basis of the great majority of modern educational technology related developments. This type of technology is called ET-III or Operating Systems or Management Technology. The concept refers to a dynamic order of parts and processes in mutual interaction. For example, class room is a system of a bigger system, the school and all the systems have goals in accordance with the overall goal of the bigger system. Systems approach refers to the methods of performing tasks, i.e., systematic way to design, carry out and evaluate the total process of education to meet the pre-determined objectives set before education. The basic assumption of systems approach is that teaching is a science a professional activity aimed at achieving certain educational objectives.

1.9 EVALUATION

1. What do you mean by educational technology?

2. Bring out the meaning of educational technology with the help of 'definition'.

3. Discuss the nature of educational technology.

4. Distinguish between technology of education and technology in education.

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5. Educational technology is nothing but ‘audio – visual aids’. Do you agree? Argue on this comment.

6. Educational Technology is a boon given to education – elaborate.

7. What are the objectives of Educational Technology?

8. Describe the different types of Educational Technology.

9. What are the approaches to Educational Technology?

10. Distinguish between hardware and software approach.

11. Classify Educational Technology.

12. Distinguish between Teaching Technology, Instructional Technology and Behavioural Technology.

13. Discuss the scope of Educational Technology.

1.10 LET US SUM UP

The tremendous explosion of knowledge has changed the very phase of teaching- learning process of education. We cannot lessen the importance of educational technology at this juncture where severe threats are posed due to the explosion of population. A thickly populated country like India where mass education is the demand of the time, only educational technology is advisable. Teaching learning strategies can be selected easily with the help of educational technology. Educational technology tries to findout the educational needs and aspirations of the community and the resources available in that community for the fulfilment of these needs and aspirations. Educational technology tries to design the curriculum suitably for achieving the desired objectives. The whole teaching learning process the teacher is the main controlling authority. As such educational technology makes arrangement to prepare teachers to face the responsibilities of teaching with perfectly trained knowledge. Robert A. Cox defines "Educational Teleology is the application of scientific process to men's learning conditions”. S.S. Kulkarni defines Educational Technology as "the application of the laws as well as recent discovering of science and technology to the process of education." Educational technology can be classified into three distinct types on the basis of its multifaceted concept. These are Hardware approach, Software approach and Systems approach.

1.11 POINT FOR DISCUSSION

Has Educational Technology influenced the rural students adequately?

1.12 UNIT – END – ACTIVITIES

a. Chart out the scope of Educational Technology:

b. Prepare a 'Capsule' to highlight the advantages of 'Educational Technology'

1.13 ANSWERS TO CHECK YOUR PROGRESS

1. Objectives
2. Presentation
3. Systematic
4. Technology in
5. True
6. True
7. True
8. True
9. b
10. c
11. c
12. a

1.14 SUGGESTED READINGS / REFERENCES

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UNIT II - TEACHING - LEARNING PROCESS AND EDUCATIONAL TECHNOLOGY

STRUCTURE



2.1 INTRODUCTION

Teaching is a system of action involving an agent, an end in view and a situation including two sets of factors- those over which the agent has no control (class-size, size of class room, physical characteristics of pupils, etc.) and those which he can modify (ways of asking questions about instruction and ways of structuring information or ideas gleaned).

There are three elements in this definition:

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- Teaching is a system of action.
- Teaching is directed at a goal.
- Teaching occurs in a situation comprising the controllable and uncontrollable sets of factors.

The skill in teaching behavior is exhibited in terms of the extent to which a person called 'teacher' who is fluent in manipulating the factors such as presenting of information, asking of questions, and providing of reinforcement or feed-back. Smith asserts that the definition of teaching presented by him is 'descriptive' rather than 'normative'.

The term 'learning' implies a change in the behavior or performance capability of an individual. It is manifest in our enhanced capacity for individual though and action but it is patently acquired rather than innate form of behavior and essentially a personal rather than social act.

Ernest R. Hilgard and Gordon H. Nower (1996) described learning as "a process by which an activity originates or is changed through reacting to an encountered situation, provided that the characteristics of the change in activity cannot be explained on the basis of native response tendencies, maturation, or temporary states of the organism".

2.2 OBJECTIVES

After going through this unit, you will be able to :

- describe the importance of Teaching - Learning Process
- explain the nature of Teaching -Learning Process
- understand the principles of Teaching - Learning Process
- Establish relationship between Teaching and Learning

2.3 CONCEPT OF TEACHING – LEARNING PROCESS

According to Michael Oakeshott "teaching is said to be a two-fold activity of communicating 'information' (instructing) and communicating judgment (imparting) and learning is said to be two fold activity of acquiring 'information' and coming to the facts which are specific, impersonal and mostly to be taken on trust, while the term judgment is that which, when united with information, generates knowledge or 'ability' to do, to make, or to understand and explain". In other words, judgment is the ability to think, and the ability to use information or the ability to invest information in answering questions.

Thomas F.Green talks of a 'teaching continuum' which comprises training, indoctrinating, conditioning, showing and

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instructing. These are also referred to as modalities of teaching which are interrelated. So conceived, teaching is a molecular concept. That is as an activity, teaching can best be understood not as a single activity, but as a whole family of activities within which some members appear to be of a more central significance than others.

Skinner defines teaching as an "arrangement of contingencies of reinforcement". Shib K. Mitra in his national lectures at Centre of Advanced study in Education defined teaching "as a series of acts carried out by a teacher and guided by the formulation of teaching task in a formalized instructional situation". According to him these acts constitute a series and are conducted by a person who is known as a teacher in a contractual situation so that one can identify him on the basis of the contract.

A close study of the aforementioned definitions of teaching may bring out the following ten qualities in this concept:

1. Teaching is a system of activities. In other words it is a number of logically contrived set of activities having a specific structure, form and orientation.

2. Teaching is aimed at changing others or causing learning in others. Without a suitable goal or objective, no worth while teaching can be arranged.

3. The core of teaching act is interaction between teacher-pupil(s) and a subject-matter. Thus, it is by its very nature a social enterprise involving a dynamic interaction among the triad.

4. Teaching involves an influence orientation where the direction or focus of control is from the teacher to the pupil.

5. Teaching does not just occur, rather it is a planned and an implemented set of activities in an interactional setting in terms of the prior thought about the learning goals, instructional strategies and the subject-matter configuration.

6. As it is practised, teaching implies and "international" rather than 'success' act. In other words, when a person called teacher engages in the act of teaching, his intention is to cause learning but he may or may not succeed in the achievement of this goal. It is for this reason that we often debate the 'effectiveness' of teaching from one situation to the other.

7. The verbal action – use of language at various levels – constitutes of predominant at feature of teaching act in any context. The analysis of teaching act is, therefore, quite

frequently conducted with the help of data collected from the verbal behaviour of teachers' It may, however, be useful to remember that both verbal and non-verbal parts of teaching behaviour occur simultaneously and function in close juxtaposition to each other in order to accomplish the necessary effect.

8. The critical attribute of teaching act involves 'reasoning' and 'an enlightened analysis of facts'. It is not concerned with bare listing or relaying of facts in a mechanical fashion.

9. The entire teaching act can be explained in terms of three definite phases within it – the introductory or orientation phase, the development and fixation phase and the evaluation phase. The introductory or orientation phase involves the presentation of the new information, concept or behaviour, the development and fixation phase implies their establishment in repertoire of the learner and the evaluation phase indicates the point where the designer of the instructional system checks as to the extent of learning having occurred. The teaching act by itself can also be prefixed and suffixed with two different stages. The prefix is now given a name of 'pre-active' stage and the suffix is called the 'post-active' stage of teaching. In the pre-active stage, the goals of teaching are decided, the content of presentation is identified and the strategies and tactics for interactional setting are planned. In the post-active stage of teaching, the events of the interactive stage are analysed in retrospect and decisions for further interactions in a face to face set up are taken. The interactive stage is the actual teaching conducted by the teacher when he is before his pupil or pupils.

10. The teaching act can be analysed in terms of memory, understanding the reflective levels with an almost closed to open classroom structures.

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2.4 CONDITION OF TEACHING - LEARNING PROCESS

The form of activity called 'conditioning' entails minimal use of intelligence or reasoning on the part of the participants in the process of education. In this modality of teaching, the learner does not take the initiative of learning. The new behavior is shaped either through pairing of two stimuli (the case of classical of Pavlovian conditioning) or through arrangement of response-reinforcement contingency (the case of instrumental or operant conditioning).

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The concept of conditioning seems to be related to the concept of training because as both aim at shaping behavior. In the way, it is also allied to teaching. But conditioning is closer to training rather than to teaching as such. Daily we come across cases of conditioning in the classroom and outside in in the family or other informal contexts. The critical feature of conditioning lies in the fact that a simple association between two stimuli or between a response and reinforcing stimulus is considered important. Thus, the concept of conditioning is peripheral to the concept of teaching but enters into our thinking because of its resemblance to training which is not peripheral.

2.5 RELATIONSHIP BETWEEN TEACHING AND LEARNING



The teaching and learning are two separate activities but they are inter related. Teaching is a contrivance, a planned or designed system of activities and learning is the goal or the desired result or the intended outcome.

There are three possible relationships between teaching and learning:

1. Teaching is connected to learning in a means-end relationship. Teaching is a planned instrumentality and learning is the intended goal.

2. Teaching essentially implies learning and hence the justification of ‘T-L’ model. The hyphen between ‘T’ and ‘L’ indicates that ‘T’ is in integral relationship with ‘L’. It implies that there can be no teaching without learning and there can be no learning without teaching.

3. Teaching and learning are two independent set of activities and each can be analysed separately. However, the analysis and description of one may be found useful for understanding the nature and scope of the other.

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The first type of relationship between teaching and learning as indicated here is usually perceived. Wherever and whenever we plan and implement a system of instruction or teaching, some kind of learning goal is always implied. The second type of relationship as formulated in this regard is difficult to sustain on logical grounds. This is particularly so since there may be numerous instances of teaching without any concomitance of a learning event and there may also be examples of learning (as in self-learning) without any formal act of teaching to account for it. The third type of relationship as stipulated and shown here is in fact a state of no relationship as stipulated and shown here is in fact a state of no relationship and arises from the imperatives of empirical studies or researches on teaching which advocate the delinking of the two concepts for the sake of academic convenience and conceptual clarity.

2.6 VARIABLES OF TEACHING

A good teaching has been explained as having a provision of learning experiences so that the teaching objectives may be achieved as a result of desired modifications in the behavior of pupils. For this, the knowledge of various aspects and activities of teaching is necessary for a teacher. Hence, in this unit, by explaining the various aspects of teaching and variables therein, we are throwing light on various teaching activities in detail. John Brubacher rightly says: ‘Teaching is an arrangement and manipulation of a situation in which there are gaps and obstructions which individual will seek to overcome and from which he will learn in the course of doing so.”

A variable has been defined as ‘Any response or behavior which can take different degrees’ – For example, effects of various amounts of study on school performance.

A teaching process has three variables-

1. **The Teacher**: The first variable of teaching is ‘the teacher’ The teacher is said to be an ‘independent variable’. The teaching organization, planning and its organization is carried on by the teacher.

2. **The Pupil**: The second variable of teaching-process is ‘The Pupil’. The pupil is considered as the ‘dependent variable’ because the teaching has to be active in accordance with the planning, organization and presentation.

3. **The content and Teaching Methods**: It is the third variable of the teaching: It has been termed as ‘Intervening variable.’ Interaction between pupil and the teacher, teaching method and

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the nature of teaching material that intervene in the responses of the pupils.

Types of Variables

The variables are mainly of three types which are as follows:

(a) **Independent Variable**: An independent variable is that variable in which the experimenter can bring changes and that variable brings a change in the dependent variable. We can manage the independent variable according to our will.

(b) **Dependent Variable**: The dependent variable is that variable which acquires changes as a result of changes occurred in some other dependent variable.

(c) **Intervening Variable**: A variable located or active in between an independent and a dependent variable is an intervening variable. Example- In the teaching process, the teacher is an independent variable, the pupil is dependent variable and the methods to be used in teaching, motivation techniques, contents etc. are all examples of intervening variables.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit

Fill in the blanks

1. Teaching is an ……process involving teacher and pupil.
2. Teaching is a systematic action intended to…….learning.
3. There are three variables of teaching namely independent variable dependent variable and ……………variable.

True or False

4. Memory level of Teaching is dominate by the teacher.
5. The subject matter of teaching is structured and planned in levels of teaching.

Choose the correct answer

6. Input variables include of learners
   a. capabilities b. initiatives c. Interest
7. Function of an output variable is ……………
   a. Evaluation b. Teaching c. Learning

2.7 PRINCIPLES OF TEACHING

Maxims of teaching deserves more careful consideration for teacher to enable him to make the teaching and learning forward.

Practical application of these maxims is a most effective and efficient teaching and are indicative of readability. Utility of the maxims of teaching may be under as follows:

"Maxims of teaching have been discovered, not invented. They are simply statements of the way in which teaching learning go forward. They ensure effective and efficient teaching."

Meaning: Distribution of the knowledge and the teaching ability, both are separate. A teacher is said to be a failure if he is unable to distribute the knowledge to the pupils. Teaching is an art and to acquire efficiency art, the teacher needs two things; the complete knowledge of the subject-matter; the scientific knowledge of the teaching style disseminating the knowledge to the pupils.

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Psychology tells us that the various laws of learning derived from many experiments from time to time along the essential elements of the learning. The educationists presented their experiences and decisions in the form of maxims considering these laws and elements as basic teaching.

These experiences and decisions are named as maxims of teaching. By foil these teaching maxims, teachers get amazing results is teaching task, i.e., the pupils acquire success very conveniently

The educationists who have contributed in developing teaching maxims are Herbart, Spencer and Comenius. Usually, a new teacher or student-teacher face difficulties while performing teaching functions. Therefore must acquire the knowledge of these maxims of teaching during their training period. This will make clear to them when the teaching should be started and in what sequence it should be done and how it should be done?

Since these maxims of teaching convey us the starting point of the contents the direction in which we should move in order to achieve objectives. Some main teaching maxims are as follows:

2.7.1 SOME ESSENTIAL PRINCIPLES OF TEACHING

1. *From Known to Unknown.* The meaning of 'from known to unknown' is that the basis of the pupil's new knowledge should be his previous knowledge. It is a psychological fact that it becomes very difficult to acquire the new knowledge if it is presented before the pupil at once. But he takes interest in learning new knowledge if it is linked with the pupil's previous knowledge.

Hence, it is the duty of every teacher that before teaching anybody, he should activate his previous knowledge and present new knowledge on the basis of that activated previous knowledge of the pupil. It means to say that those small and simple information with

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which the pupil is already familiar, should be made basis for imparting unfamiliar information.

Every teacher, especially pupil-teacher, should move forward after establishing relationship between that known and the unknown. In other words, whatever the pupils know, the new knowledge of the unknown should be given on that basis.

For example, if a pupil is already familiar with the soil of the surrounding plains, facilities of water and the production of that area then it would be easy to provide him knowledge about the cultivation of that state on the basis of that previous knowledge while teaching geography.

2. *From Seen to Unseen.* The meaning of this maxim is that the pupils should be aware of those things which are at perceptional before them first and then those things should be presented which don't exist before them. Its only reason is that psychologically, the pupils ranging from 6 to 14 years functions at perceptional level only.

From this point of view, first of all the **knowledge** of present should be imparted to the pupil and then regarding past and future. In short, the teacher should use the scene or perceptual things in order to impart the knowledge regarding unseen non-perceptual along-with concerned example. This facilitates the necessary knowledge concerning non-perceptual thin (unseen).

3. *From Simple to Complex. A* key to successful teaching creating interest in the pupils for new knowledge and develop self-confidence in them. From this point of view, if the teacher is to be made successful, it is essential to use a maxim calk 'From Simple or Complex'.

This maxim means the teaching of simple to the pupil fir and then the complex contents should be taught afterwards, this is not followed; the pupils will lose their confidence. This will reduce their interest in the subject, they will lose the heart and they will not concentrate their mind in the studies.

Therefore, we should divide the subject-matter in such way that the simple aspects should come first and these should be followed by the complex one in an order. Now the question arises that which aspect is simple and which one is complex It should be remembered that the things simpler in teacher' view may be complicated for pupils.

For example, drawing a straight line may be simple for teacher but it may be difficult for a pupil. It is also possible that the things which a teacher considers difficult for the pupil may be easier for those pupils. For example, drawing an animal' picture may be viewed *by* the teacher as a difficult task for < pupil but it is actually very easy for that pupil.

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In this light, the teacher should decide what is easy and what is difficult keeping in view the interest, attitude, ability potentiality and needs of the pupils. In short, as the pupil's mental development occurs, the lessons should be made complicated gradually. This will keep the interest of the pupil and the teacher will achieve success in the Teaching work.

4. *From Particular to General.* This maxim means that the specific examples should be presented before the pupils first and then the general laws or principles should be derived from those specific examples.

According to this maxim, the teacher should present some specific examples before the pupil. Then the same example should be evaluated and after understanding the fact, pupils should be motivated to derive general principles.

For example, if a teacher wants to explain his pupils that when the solids are immersed in a liquid, they lose their weight. He should perform two experiments before his pupils. First, the solids should be weighed in air. After this, the same solids should be weighed in a liquid. When the pupils conclude this, from their own observation and testing, that the solids lose their weights while immersed in a liquid, they will derive this general principle themselves without any difficulty.

In this way, in any subject, especially while teaching science, mathematics and Grammar, various laws can be derived with the help of pupils.

According to this maxim, pupils get sufficient opportunities to derive themselves general principles through observation and testing. This encourages them and they start taking interest in doing tasks.

When the pupils learn themselves by doing, they need not to cram the knowledge, however, it becomes a permanent and clear part of their thinking. The above description of the maxim tells its utility. Therefore, in the inductive method of teaching, this maxim is used.

5. From Indefinite to Definite. It is a psychological fact that the pupil's intellectual development proceeds from indefinite to definite. As the pupil grows, his senses develop. Through these sense organs, the experiences go on gaining the knowledge regarding different objects while living in the contact of his parents, brother-sister, other family members and the surrounding social environment.

On the basis of this gained knowledge he gradually makes his personal concepts regarding each object. These concepts or ideas are generally vague, unclear and uncertain. It is the duty of the teacher that

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he should provide certainty to the uncertain knowledge of the pupils by using concrete objects, pictures and examples.

6. *From Concrete to Abstract.* It is a psychological fact that the mental development of the pupils begins with the concrete objects and afterwards he gains micro-words for them. Therefore, to begin the education of pupils, the concrete object and fact should be made known first.

In other words, when knowledge about small things (micro) is to be imparted to the pupils of lower classes providing a definite shape to their ideas, the same objects be shown or their models, pictures and lines can be use.

For example, while teaching geography, the knowledge of mountains, lakes, rivers and oceans can be either imparted through seen or perceptual things very successfully.

7.From Whole to Part. In the twentieth century, psychologists proved that we first perceive the object whole and then its parts. In other words, we gain know about the 'whole' first and then about the 'parts'. For exam when we see our fan working in our room, first of all, whole picture of the fan comes before us and then of parts.

Similarly, when we see some tree, our attention goes the entire tree, then on its stem, branches and leaves this is called Gestalt theory. Remember that it is essential study the background and environment of the object which the knowledge is to be gained according to this Gestalt theory.

Hence, the teacher should present before the pupils new teaching matter as a whole and in an organized way f and then its parts should be explained on the basis of 'whole' and organized teaching-matter.

According to this maxim, by starting with the 'whole' the teacher imparts knowledge about each and every part the object to the pupils. While teaching a language, first \ sentences should be taught and then the words. In this it should be pre-decided what the 'whole' is? While teaching Geography teacher should consider earth as a 'whole'. He should not give, first, the knowledge about the entire earth and then about all the countries a: then its various parties

Remember that the quantity of the 'whole' increases an increase in the knowledge of the child. For example, for year old pupil, his lane is 'whole' and for 12 years old pupil, his state is 'whole'. Hence, first of all the 'whole' of the pupil should be decided beforehand. Then its parts should be studied.

8. *From Psychological to Logical:* This maxim means to follow a sequence from psychological to logical while providing knowledge to

the pupils. According to psychological order, the knowledge about some object or subject should be presented according to the age of pupils, curiosity, interest, needs and acquiring power.

Contrary to this, logical order means the present action of the knowledge before the pupils after dividing it logically into various units. While presenting the knowledge logically, the pupil's interest, age and acquiring-power are over-looked and only logical presentation of the subject-matter is emphasized whether the pupils understand it or not.

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Therefore, the presentation of the knowledge in psychological order or sequence is definitely better and useful instead of teaching in a logical manner. Remember that the presentation of knowledge in a logical manner was considered good in old days, but in this modern age, the psychological order is being considered better as psychology has gained more importance.

Therefore, the education of language is started with the sentences now-a-days instead of alphabets and sounds. In short we should teach in lower classes according to his maxim by using psychological order instead of logical order. But, the logical order must be adopted as the pupil enters higher classes along with mental development. In other words, we should proceed from psychological order to the logical order.

9. *From Analysis to Synthesis.* Initially, the knowledge of pupils is vague, uncertain and unorganized. In order to make his knowledge clear, define and well-organized, a maxim named "From Analysis to Synthesis" is used essentially.

Analysis means to divide a problem into such living components which on assembling them may solve the problem. In other words, in analysis, the problem is separated into its various elements and then they are studied. For example, while leaching geography, if the pupils are to be taught about earth, we shall study by dividing it into different parts on the basis of climate.

This system can be used in geography, geometry science and grammar in which the problems can be made distinct and which can be divided into different parts.

10***. From Empirical to Rational***. This maxim means the pupil's empirical knowledge is more rational so that it be valid and definite. Remember that the empirical know that which a pupil gains through his own observation pupil observes usually the freezing of water in winter converting water into steam in summer.

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Similarly, he looks every day rising up and setting the sun. If the same pupils are questioned about the form of water and its steaming, these pupils, perhaps, will able to answer scientifically and logically.

In such a situation, according to this maxim, it is best for a teacher to make the pupil's **empirical** knowledge rational. This will make the pupil's knowledge more definite.

11. Follow Nature. The meaning of this maxim is to the education of a pupil according to his nature. Hence, sources of education should be based upon the physical and mental development of the pupil.

In other words, whatever knowledge is to be given pupil that should be according to his physical and mental development. Hence, the teacher should follow the pupil instead of his discretion.

It means to say that the education which obstructs development of the pupil in any way is un-natural and un-psychological. Therefore, the teacher should do nothing which hampers the physical and mental development of the pupil. In short, the teacher should follow the nature of the pupil.

12. Encouragement to Self-Study. According to this maxim, self-study has been emphasized. Its only reason is that the actual teacher remains hidden in the pupil. When the pupil is absorbed in self-study and acquires some sort of knowledge then that knowledge becomes an integral part of his mind.

Therefore, great educationists like Rousseau have given important place to the self-study. Dalton's system is based on self-study. Hence, according to this maxim, it is required that the teacher should study the content first and then give it to the pupils for self-study. He should remove the difficulties of the pupils. In short, the pupils should be motivated, assisted and encouraged for self-study.

13. Training of Senses. The pupils have mainly five sense organs. These are (1) an eye, (2) a nose, (3) taste, (4) smell, and (5) touch. All these sense organs are gateways of knowledge. With the help of these sense organs, the pupil forms concepts in his mind about the various sizes in this universe, types, colours, weight, quantity, density, area and temperature etc.

According to this maxim, the teacher should maximize the training to the above mentioned sense organs of the pupil. If these sense organs are trained properly, the pupil will form concepts of each object correctly in his mind. This will make his knowledge true and definite. Educationists, like Montessori and Froebel have emphasized the use of this maxim.

By throwing light on above mentioned maxims, it is very much clear that all the maxims help in lesson-planning and guide the pupils keeping in mind the interests, attitudes, abilities, capacities and various levels of development of the pupils. From this point of view, if the teachers especially pupil-teachers want success in the teaching task, its complete knowledge is essential for them.

2.8 ROLE OF EDUCATIONAL TECHNOLOGY IN TEACHING – LEARNING PROCESS

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Educationist now-a-days realize that in education ‘learning’ is more important than ‘teaching’. Learning is concerned with pupils whereas teaching is concerned with pupils and teachers.

The two general factors- “information explosion” and “population explosion” are bringing about changes in the developed and developing countries. Both of them have posed critical problems for education. It is not possible to solve them by conventional means. For solving these problems successfully, educational technology consisting of various media of mass communication, suitable child learning process and modern testing and evaluation techniques are required. Especially in developing countries like India, it has to be mastered and utilized by educationists, if they are to keep pace with each other and catch up with developed nations. As such, both quantitative expansion as well as qualitative improvement of education can be facilitated and accelerated with the help of educational technology. As A. Pater has succinctly pointed out, “Today a technology of education is being developed with the aim not only of making education more widely available, but also of improving the quality of education which already available.”

Any kind of educational improvement should be preceded by suitable curriculum reforms. Curriculum is the sum total of learning experiences provided by school. It is called the “stuff of education”. It is what we teach, what the students learn, what we examine for we give degrees or diplomas for when students pass through. Seth Spaulding (1970) has very rightly observed that one of the reasons for current student unrest throughout the world is the fact that curriculum reform has not been continuous and the curriculum has not been entirely relevant, neither to what the student brings to it, not to what the student expects from it. Educational Technology assists in the process of curriculum reform and there by improve the teaching –learning process.

On the basis of broad objectives, curriculum planning should be done and suitable subject content, behavioural outcomes and other

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learning experiences be put in for making curriculum comprehensive. It should be based on the findings of curriculum research and be enriched by interdisciplinary collaboration among experts on different subjects. All this would contribute to the design of a total school curriculum that is complementary as well as comprehensive. These broad goals are then spelt out into behavioral goals in concrete terms. Suitable methods, strategies and materials would be suggested and tried out and then improved upon. Accordingly, teacher training programmes would be formulated and implemented for training teachers to enable them to manage with competence the new content, new media and new materials. Educational Technology paves way for these new changes and ensure the effective teaching –learning process.

Although in a narrow way educational technology means little more than the use of sophisticated hardware in teaching, including overhead projectors, tape-recorders, televised films, cassettes video-discs, gramophones etc., in a broad way it may be interpreted to mean the use of any new technique or methods of teaching. Technology of education would include the entire process of setting the goal, the continuous renewal of curriculum, the trying out and use of new methods and materials, the evaluation of the system as a whole, and the resetting of goals in view of the changing circumstances. It is also often identified with various devices and means or recording, storage, manipulation, retrieval, transmission and display of data and information with high efficiency and speed. They are considered as an integral part of a broad curriculum for research and development design amounting to tremendous potentialities in education.

Thus educational technology materials have proved to help in clarifying concepts, stimulating group and individual activities, developing a collective critical awareness, changing attitudes, imposing a new structure or organizing on certain subjects and encouraging originality and creativeness.

Educational Technology has to be taken up as a comprehensive and continuous programme. The users of the new technologies have been led to state education problems in more precise terms as regards aims, organization of the subject to be taught, nature of learners activities and evaluation methods in relation to educational aims and objectives.

Educational Technology can promote a certain amount of flexibility into the functioning of the school system which has been in a rut for decades. For imparting in-service training to teachers and improving their professional growth, educational technology provides ample opportunities. It also works as a means of rapid dissemination of education on a massive scale and of increasing the effectiveness of education by making learning more individual process. Moreover,

educational technology implies assembly-line methods for the production of teaching materials and a division of talent in their uses.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

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Fill in the blanks

8. Planning on directing skill to some purposeful objectives is called…………..
9. ……………..entails minimal use of intelligence or reasoning on the part of the participants.

True or False

10. Teaching is a cause and the learning is the expected or stipulated result.
11. Teaching represents a spectrum of activities whereas learning constitutes a singular act.

Fill in the blanks

12. Teacher should proceed from simple to ………………
13. Conditioning takes place of the designed ………. is associated with positive reinforce.

2.9 EVALUATION

1. Define teaching.
2. Why teaching is considered both art as well as science?
3. List a few important characteristics of teaching.
4. Briefly discuss the functions of teaching variables.
5. Discuss the operations in various phases of teaching.
6. Choose the right answer
    1. The teaching learning process is subject centred and teacher domination.
        a) Memory and learning
        b) understanding levels of teaching
        c) reflective levels of teaching.
7. Discuss the merits and demerits of different levels of teaching.

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2.10 LET US SUM UP

A close examination of the concepts of teaching and learning facilitates the study of the dynamics of teaching behavior. It also helps in the formulation of a proper scheme for relating the two activities of teaching and learning. Teaching is a system of activities planned and implemented with reference to a social situation. It planned and implemented with reference to a social situation. It consists of a number of strategies and is primarily goal – linked or goal – directed. Learning is a behavioral change. It usually occurs as a result of consciously instrumentalities which we refer to a teaching.

The difference between teaching and learning may be set up chiefly in terms of conceptual orientations. Teaching represents a molecular concept whereas learning indicates a molar concept. The former is an 'intentional' task work while the latter is used in a success sense to denote an achievement. The direction of influence between teacher and pupil (s) in an act of teaching is non-symmetrical as it is the teacher (X) who intends willfully to guide, direct and to influence pupil (Y) in the course of teaching. Learning, on the other hand, is dependent on the initiative of the learner and it is a highly individualistic act.

Teaching comprises a closely connected set or family of activities – conditioning, training, indoctrination and instructing. These four modalities of teaching may be broadly put under two categories: 'teaching to' and 'teaching that'. The first category includes conditioning and training while the second category consists of indoctrinating and instructing. The focus in 'teaching to' is on shaping the behavior whereas in 'teaching that, the major concern is on shaping of beliefs and transmission of knowledge. Each of the four forms of teaching may be differentiated on the basis manifested intellectual operations such as questioning, arguing and examining of the grounds of statements and propositions involved.

In logical terms both teaching and learning may be separated but in terms of valuation they are closely tied up. Thus, all teaching is goal-linked and such a goal is always some kind of learning.

2.11 POINT FOR DISCUSSION

How will you cherish a conductive climate for strengthening Teaching- Learning Relationship?

2.12 UNIT - END ACTIVITY

Enumerate the aspects of Maxims of Teaching.

2.13 ANSWERS TO CHECK YOUR PROGRESS

1. Interactive

2. Induce
3. Intervening
4. True
5. True
6. (a)
7. (a)
8. (b)
9. (b)
10. True
11. True
12. Complex
13. Response

2.14 SUGGESTED READING/REFERENCES

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Notes

UNIT – III SYSTEM APPROACH

STRUCTURE

3.1 INTRODUCTION

Educational Technology may also be viewed as a systematic way of learning and teaching in terms of objectives. As such, then, educational technology can be seen as a thematic approach. The moment the word "system" is used, one is impelled to recognise the individual parts that go towards making of whole system. The concept of educational technology is based on the systems concept and its application could be made effective with the help of the systems approach the methodology emerges out of the concept of wholeness.

The instructional process has become complex these days. This cause the number of objectives to be achieved by the instruct programme has increased. The amount of material to be taught an media to be utilised have also enormously increased. The number of students and teachers involved in the total instructional system has also increased. In such a situation, there is very great need for comprehension detailed planning. The curriculum should not only specify students behavioural objectives but also suggest strategies for helping the student realise the objectives and suggest evaluation instruments to measure success. This is called the systems approach, an

operational planning concept, borrowed from the engineering sciences which deal with and self-sustaining systems.

3.2 OBJECTIVES

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After going through this unit, you will be able to :

- describe the importance of Instructional System
- explain the steps in System approach
- understand the advantages of system approach

3.3 DEFINITION OF A SYSTEM

The Webster's dictionary defines a system as "a regularly interacting or interdependent group of items forming a unified whole". A system is "a group of objects related or interacting so as to farm a unity". It also defines the system as "organised or established procedure", or a "methodically arranged set of ideas, principles, methods or procedure". Systems analysis essentially is a systematic way of identifying goals of any system and scientifically working out the different steps to move towards these goals, suggesting "models" for application.

The term "systems approach", "systems analysis" or "systems procedure" are used in literature at various levels of sophistication. At a layman's level, they indicate systematic thinking, step-by-step problem-solving and/or considering many variables not in isolation of each other but as interacting with each other, studying the phenomenon as a whole and not in bits and pieces.

At a more sophisticated level, the systems approach is characterized in the following manner:

1. It proceeds from a particular problem space to a general universe.
2. It infers the design of the best system by induction and synthesis.
3. It proceeds to a cycle of analysis and synthesis. Now, the methodological steps included are:
   - Defining the boundaries of the whole system and its environment;
   - Determining the programme structure and relation-ships;
   - Describing the systems mode of operation;
   - An analysis of the existing situation;
   - Setting up of goals for the desired situation;

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- Defining mechanism to evaluate the achievement of goals;
- Generating alternative solutions;
- Choosing the best possible solution through cost-benefit analysis;
- Detailing out the design of the system;
- Outlining the monitoring mechanisms for the system; and
- Working out for introducing the solution.

Thus, the systems approach is an overall approach. It helps in designing a complex system by the efficient use of resources in the form of men, money, machines and materials so that the individual sub-system making up the total system can be designed and fitted together, checked operated so as to achieve the desired goal in the most efficient manner.

According to Makridakis, "Systems approach is basically a way of thinking and it 'What is going on here' **attitude** which makes the systems way of thin and the major characteristics of the systems approach is its recognition the need to seek things".

Systems approach is thus a rational, problem-solving method for analysing the educational process and making it more effective. System the process taken as a whole incorporating all its aspects and parts, pupils, teachers, curriculum content, instructional materials, instructional strategy, physical environment and the evaluation of instructional objectives. Hence it may be seen that the purpose of the systems analysis is the "best equipment in the best place for the best people at the best and at the best price".

"The systems approach in instruction is an integrated, programme of complex instructional media, hardware and personnel whose components are structured as a single unit with a schedule of time and at sequential phasing".

3.4 COMPONENETS OF AN INSTRUCTIONAL SYSTEM

Systems approach is a systematic attempt to coordinate all problems toward achieving the specific objectives. In education it means the planned, organised use of all available learning resources eluding audio-visual media, to achieve the desirable learning object the most efficient means possible. The systems approach focuses firs the learner and the performances required of him. Only then it decisions regarding course content, learning experiences and the most effective media and instructional strategies. Such a system incorporates within itself the capability of providing continuous self-correction and improvement. It is concerned with all the elements of instruction, inc

media. Its purpose is to ensure that the component of the organic will be available with the proper characteristics at the proper time till the total system fulfills its objectives.

The procedural steps in the system approach in education are

1. Defining instructional goals, behavioural objectives in measurable terms.
2. Determining the functions related to the achievement of these goals by proper aids like films, Recordings, video etc.
3. Defining learner characteristics and requirements.
4. Choking appropriate methods suitable for effective learning of tne topic.
5. Selecting appropriate learning experiences from the many alternatives available.
6. Selecting appropriate materials, facilities, equipment, resources, environment, tools required for student experiences.
7. Defining and assigning appropriate personal roles — teachers, team teaching members, supporting personnel students.
8. Implementing the programme. Try with a few pupils in a typical and appropriate condition.
9. Testing and evaluating the outcome in terms of original objectives measured in student performance.
10. Refining and revising — if necessary, to improve production. In an instrumental system, the teacher (or the instructor) and the resources made use of by him/her are included as components of the system. There is provision for continuous evaluation and self-correction for realising the stated objectives. In the systems approach to instruction, the teacher has to plan completely the utilisation of selected resource material and the classroom activities (each pupil working alone; small groups of pupils, 4 to 6, working alone with teacher guidance, large groups working alone; very large groups requiring the use of mass communication media). The teacher should have a good overall view of the subject, know his/her limitations, know all about his/her pupils and the individual differences in their learning capacities and plan accordingly. The systems approach involves continuous evaluation of learning outcomes and utilisation of knowledge gained by the analysis of results of evaluation, to suitably modify the plan of approach to achieve the stated objectives.

    In brief, the systems approach applied to educational situation involves the following interlinked and interdependent stages:

(a) Explicitly stated standards of output performances, including sequenced behavioural objectives and post-test;

(b) Planned inputs and processes involving structural learning materials and methods suitably geared to the need of a particular group of learners,

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(c) Monitored output which is used to revise, improve and evaluate the instructional system, providing feedback to the learner and teacher; and

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

Fill in the blanks

1. System is a set of .... things

2. System analysis is a systematic way of identifying .... of any system.

3. System approach is an innovative and ……….problem solving method in analyzing the educational system.
   a) random b) National c) intelligent

True or False

4. Characteristics of a system analysis is integrating uncertainly into daily action.
5. Co-ordination, Co-operation and integration are the common goals of system approach.
6. System approach providers …………frame work to build plans.
   a) Conceptual b) goal oriented c) Assignment
7. …………….in the plan of action is avoided in system approach
   a) Rigidity b) Flexibility c) both

3.5 FLOW DIAGRAM FOR DESIGNING A SYSTEM

System approach aims solving problems through scientific approach involving effective and efficient strategies. Basically it has four components which are as follows;

i. **Input,**

ii. **Process,**

iii. **Output, and**

iv. **Feedback**

According to Maleridakis, systems approach, is basically a way of thinking and it is the 'what is going on here attitude which makes the system way of thinking and the major characteristics of system approach is its recognition of need to seek things.

Notes

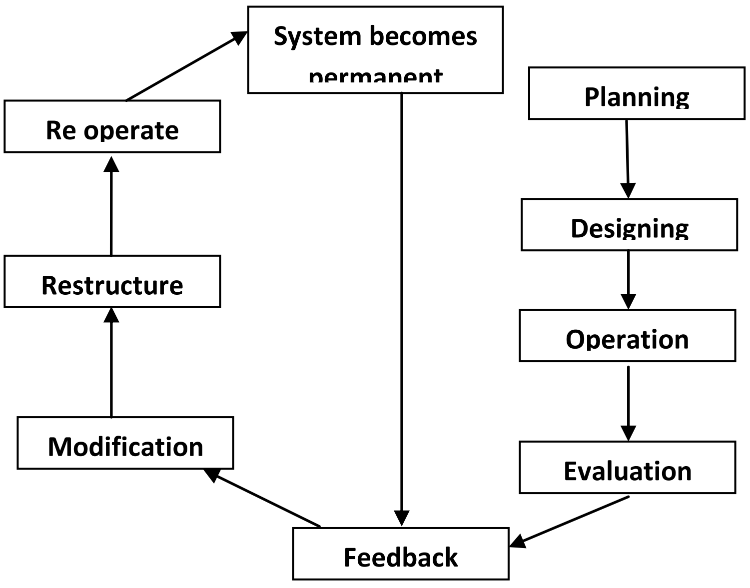


Fig.3.1 System Approach

3.6 STEPS IN SYSTEM APPROACH

The following section describes the steps involved in system approach. Generally there are four steps are involved which are as follows;

i. **Input,**

ii. **Process,**

iii. **Output, and**

iv. **Feedback.**

Step- I. Input

The following entries may be taken into account with reference to input;

Pupils:

a. Age
b. Minimum prescribed entry qualifications, attainments decided (i) curriculum content (ii) duration of the course.
c. Desirable to consider

(i) Attitude, and (ii) Aptitude of pupils.

d. Cost factor which is a constraint on input should also be considers terms of its benefits.

- Job opportunities after passing out.
- Location of the institute: (i) Rural, (ii) Urban.
- Hostel facilities — cost — finance involved.

Notes

Step - II. Process

The following points are to be considered in relation to;

i. need-based

ii. Well-defined objectives

iii. Anticipated behavioural changes in pupils

iv. *Curriculum:*-suggested strategy and lines of approach (media methods)

v. Evaluation procedures laid out.

vi. *Institute*

a. *Physical environment*

For maximum effectiveness, it is necessary to consider the system as a whole remembering the interaction and interdependence of the components of the system. Full details and specifications about the interacting factors should be clearly defined. Systems approach in education may be applied to institutional planning and development in its varied aspects (macro-level) or it may be used at the classroom level with its concern of a specified topic during a brief period (micro-level).

Curriculum objectives in terms of anticipated change in student behaviour should be well-defined. The teacher and pupils should know what is expected of them upon the completion of an instructional unit. The evaluation should aim at pupils skill, knowledge, concepts, developed through available teaching material and the teacher. Based on evaluation results, more appropriate instructional materials and teaching strategies should be selected to ensure achievement of stated objectives. It may able to be necessary to change the prescribed entry behaviour of inputs based (the results of evaluation. The curriculum should be modified if the end product is not suitable to fill in the need.

Step –III. Output

The following entries may be taken into account with reference to input

i) Fulfillment of needs

ii) Realisation of objectives

iii) Occurrence of anticipated behavioural changes

Step –IV. Analysis and Feedback

The following points are to be considered with reference to;

i. Stepwise analysis

ii. Feedback

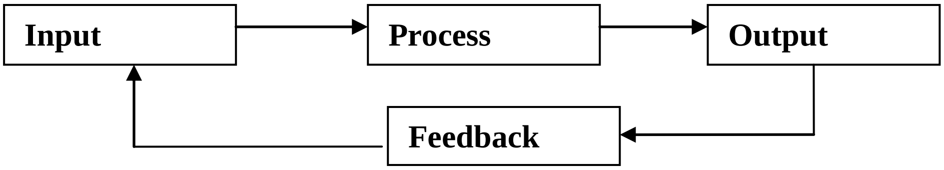


Fig 3.2 General Steps in System Approach

3.7 ADVANTAGES OF SYSTEM APPROACH

The following are the advantages of system approach

1. It provides a conceptual framework on which to build plans for implementing changes in the educational process.
2. It helps to identify the suitability or otherwise of the resource material to achieve specific goals.
3. It helps to assess the resource needs, their sources and facilities in relation to quantities, time and other factors.
4. Technological advance could be used to provide integration of machines, media and people for attaining the defined goals.
5. It permits an orderly introduction of components demonstrated to be required for the success of the systems in terms of student learning.
6. Rigidity in the plan of action is avoided as continuous evaluation affords the desired beneficial changes to be made.

Notes

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

8. .... is the first component of a system approach
9. System approach determines the …………of the resource material to achieve specific goals.
10. …. is a group of objects interacting so as to form a unity.
    a) system b) strategy c) Technique
11. ……………the outcome in terms of original objectives measured in student progress is a major steps in system approach.
    a) Testing and evaluating b) Increasing c) Modifying

True or False

12. The system approach in instruction is an integrated, programmed complex of instructional media, hardware and personnel.
13. The major characteristics of the systems approach is its recognition of the need to seek things.

3.8 ROLE OF THE TEACHER IN SYSTEM APPROACH

The general roles of the teacher in system approach are as follows:

i. Teacher has to formulate objectives
ii. He has to assess to student entry behaviour and design and develop the system.
iii. He should gong for improvement of the systems based on the analysis of resources of evaluation.
iv. The role of the teacher consists building plans for implementing changes in the curriculum.
v. He has to choose the proper resource material for delivery of message.
vi. It is prime duty to identify the resources and to develop resources if necessary.
vii. He has to coordinate the curricular and co curricular activities.
viii. He has to integrate technological advances in the educational process

3.9 EVALUATION

Notes

1. What do you mean by the term ‘System’?
2. Discuss the characteristics of a system.
3. What are the advantages of system approach in education?
4. What are the parameters of a system?
5. Education be considered as a system? Explain.
6. Apply the various factors of system approach to (a) Education (b) instruction.
7. Enumerate the steps in organisation of a system in education.
8. What are the steps in system approach?
9. List the principles to be considered in organising a system.

3.10 LET US SUM UP

System approach is a relatively new field that has emerged in the education sector. It has been introduced in the field of education as a strategy to manage, control and improve the process and products of education. System approach is applicable to all the three system. It could help in solving problems related to education. Thus, system approach in education can be designed as the planned and integrated manner of using materials, media, machines and men with their functions and interrelations well specified, so as to achieve well defined educational objectives.

3.11 UNIT END ACTIVITY

Prepare a flow diagram for teaching any unit of your liking using system Approach. Describe the steps in detail

3.12 POINT FOR DISCUSSION

Apply system Approach to Teach a subject in core syllabus discuss the advantage of system Approach.

3.13 ANSWERS TO CHECK YOUR PROGRESS

Answers

1. Connected
2. Goals
3. (b)
4. True
5. True
6. (a)

7. (a)
8. Input
9. Content
10. (a)
11. (a)
12. True
13. True

Notes

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UNIT – IV MASS MEDIA IN EDUCATION - I

Notes

STRUCTURE



4.1 INTRODUCTION

Mass media has a profound effect on public opinion. Radio, TV and newspapers are powerful media which can cast a strong influence on the minds of the people. Mass media organizations create messages which attempt to shape public opinion.

Notes

Information dissemination i.e., sending vital information across a large section of public is another important function of mass media. Mass communication media make it possible to deliver messages to millions of people at roughly the same time.

Mass media's major focus is on providing entertainment. In this world of Internet and TV technology, mass media also plays a vital role in providing Education. In this internet world, mass media plays a prominent role in providing both entertainment and education which is collectively referred to as Edutainment.

Education in its modern form, involving the instruction of pupils within specially designated school premises, emerged with the spread of printed materials and higher levels of literacy. The expansion of education the twentieth century has been closely tied to the perceived needs for a literate and disciplined workforce. The rise of mass media and the rise of mass education are closely connected because of the latter's ability to read and write to participate in public sphere.

Some media are best fitted to an audience that consists of individuals, each of who is more or less alone when message arrives. Others are best suited to an audience that gathers in groups, Books, newspapers, magazines and direct mail are usually read by individuals. Films, on the other hand, are shown in theatres where audiences are in large groups, Radio, televisions and recordings are often delivered in group settings but these groups are smaller than those who attend a film and the three are often used by individuals.

4.2 OBJECTIVES

After going through this unit, you will be able to :

- describe the Mass media
- explain the merits of broadcasting
- understand the Advantages Educational Radio

4.3 MASS MEDIA

Mass media have come to play a fundamental role in modern society. The mass media are media of communication – newspapers, magazines, television, radio, movies, videos, CDS and other forms that reach mass audiences.

Marshal Meluhan says that media are any extension of man which allow him to affect other people who are not in face to face contact with him. He argues that media influence society more in terms of how they communicate than in terms of what they communicate. He says that electronic media are creating a global village, a community in

which people throughout the world see major news unfold and hence participate in the same event.

JurgenHabermans points to the role of media in creating a public sphere – a sphere of public opinion and public debate.

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Bandrillard regards the impact of mass media as being quite different from, and much more profound than that of any other technology. He contends that in an age where the mass media are everywhere, hyper-reality is created, composed of the intermingling of peoplesbehaviour and media images.

John Thompson maintains that media have played a central role in the development of modern institutions. He says that mass media have created a new form of social interaction – mediated quasi – interaction – which is more limited, narrow and one – way than everyday social interaction.

4.4 MEANING AND SIGNIFICANCE

Importance of Mass Media

Mass communication media makes it possible to deliver messages to millions of people simultaneously. The authors of these messages are usually organizations and the audiences are composed of individuals.

The development and widespread use of printed text in Europe in the 1500 A.D. produced a new brand of communications. First used to propagate religious texts and arguments, the ‘mass approach’ to communication quickly caught on and was soon being used to distribute news, entertainment and government regulations. Today the primitive media books, as they are referred to, have grown to include print media of books, newspapers and magazines, the electronic media of television, radio and audio / video recording and the new media of computers and computer networks.

Mass media is impersonal communication to the masses through medium. It is a means of communication which carrier common messages, large number of people or pupils. Mass media are some means or in strum which communicates ideas, attitude impression, image etc. simultaneously a large number of people. It is a non-formal mode of education. At present technological information can reach the people through various electronic media. In the past teachers were the only source of information and communication for children. Up to the recent past with invention of printing presses printing materials like book, newspaper serves as medium of information and communication.

The modified National Policy of Education 1992 quoted. "The media has profound influence on the minds of children. The mass

media make constraints of time and distance manageable. Modern educational technology must reach out to the most distant areas and the most deprived section: .beneficiaries simultaneously with the areas of comprehensive affluence and ready availability."

Notes

Mass Media is the indispensable tools for educating the masses and communicating new knowledge and information to the education. They can easily reach large number of people. They perform responsible services in the spreading of compulsory education and adult literacy and as such they are very useful media-for making instruction more effective and meaning. Mass media is an absolute necessity for distance education.

Mass-media approach has two modes of communications—printed and non-printed. Printed model instructional, materials for correspondence education, programme instruction material and also in the printed materials used in distance education. These printed materials are termed as software. IGNOU (Indira Gandhi National Open University) uses a multimedia approach comprising printed material, audio and video cassettes, internet based delivery etc., as mode of distance learning to communicate the distance learner. Recently it has used Interactive Radio Counselling (IRC) in national adult literacy programme, school broadcast and training programmes for teacher. Its aim is to make learning facilities easily obtainable for areas where teleconferencing, internet based delivery etc., are not possible.

4.5 SCHOOL BROADCAST PROGRAMMES

India is a highly populated country. Education of the masses is the prerequisite of the country. Radio can be used as a most effective and useful media for broadcasting different educational program for the masses. Radio sets are easily available media of education to all sectors of the country. Along with the extension of radio station different regions and states they enjoy the facility of designing it educational programme according to the more local needs. Different country like Canada, Nigeria, Sweden, Tanjania, etc. have derived, grew benefit by attending to Radio Broadcasting Educational program Different distance mode of learning-such as Adult Education Program continuing Education become very successful through radio broadcast programme. It also includes programmes agriculture education, popular education etc

Educational Radio

Radio has been playing a vital role in the field of communication since its origin. After the growth of printed words as an instrument for the dissemination of ideas, messages, information and knowledge, the spoken word appeared with fresh educational values as

Notes

the vehicle of communication. Even though, Radio works with sound only, it has the power to stimulate values and to stir imagination and to increase knowledge and understanding.

Radio is regarded as an extension of personal communication and effective communication medium with the individual as well as the groups. At one given time, radio can simultaneously arrest the attention of thousands of people irrespective of its clientele of various educational attainments.

Teaching and learning involves communication between the teacher and the learner through a medium and radio acts as one such medium. Radio is one of the mass communication media which has got a great advantage over the other media.

Merits of radio as Mass media

As mode of mass media radio possesses the following merits.

(i) **Enriches School Programmes;**A properly organised a programme can help in enriching the existing programmes in the such Efficiently organized programme can bring the school in contact with bigger world.

(ii) **Supplements Classroom Instruction**; Radio programme can provide new information and knowledge, to supplement the existing source instruction used in the classroom and to better analyse the courses allotted offer.

(iii) **Furnishing up-to-date information**; Radio programmes prove up-to-date and correct information on day-to-day happening.

(iv) **Developing critical Thinking**;Radio broadcasting delivers programmes like, Quiz, discussion etc, which may develop critical thinking and intellect of the children.

(v) **Provides scope for useful utilization of leisure time**; Various types of programmes useful for the child they can spend their leisure time effectively by engaging themselves in programme of their interest.

(vi) **Stimulates pupils' interest;** Frequent contacts of the pupils with the broadcasting of national and international activities stimulate their interest in national and international affairs.

Besides classroom instructions, Radio broadcasting can provide helps to the children on the following ground:

a) Popularizing science.
b) Vocational skills

Notes

c) Programme for bringing the school into contact with the world around, etc.

How to make use of Radio in the Class Room

Radio broadcasting may be made effective for the pupils of classroom by following the four major phases. These are:

i. Preparation phase,
ii. Reception phase
iii. Discussion phase,
iv. Application phase

i. **Preparation phase**: Radio being an audio media, requires preparation the experience of listening on the part of the user. It is very much necessary. Otherwise radio cannot be used as useful tool of teaching and learning.

ii. **Reception:** The second important phase of classroom procedure is reception. It needs proper listening atmosphere in the classroom by arranging proper ventilation and stopping any distraction from outside. Classroom should be well arranged for both learning and listening. The radio in the classroom should be in perfect working condition and its volume should be adequately enough to enable all the students, of the classroom to listen.

iii. **Discussion and application:** Immediately after listening the broadcast news, the teacher should discuss with the pupils main points of broadcast. The information received through broadcast should be applied properly according to their relevancy.

iv. **Follow-up:** a proper follow-up of students, understanding out of the information gathered from broadcast will help children in removing their misunderstanding. Teacher can make initiative in preparing the follow up of the students by conducting a short test covering the major parts of the broadcast.

Limitation of Educational Radio

1. As radiobroadcast is a one way communication, there is no provision tostudents for further clarification.
2. To be benefitted through radio broadcasting one must have some sense of hearing. Deaf pupil cannot be benefitted through broadcasting.
3. Students remain inactive while listening to the broadcast programme

4. Most often it is very much difficult to integrate school programme with radio broadcast.
5. As radio broadcasting involves continuous listening students becomes more often inattentive
6. As there is no necessary co-ordination programmer, the broadcasting programme may not have adequate knowledge of pedagogical need.

Notes

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

1. An instance of mass media is

   a) Computer b) CCTV c) Magazines

2. Broadcasting is very much useful to…………..

   a) Slow Learners b) Gifted children c) Rich people

True or False

3. Media overcomes distance
4. Educational Radio gives a wide coverage
5. The Chief functions of man media is entertainment.
6. Media does not play a control role in the development of Modern institution.

Fill in the Blanks

7. TV Programme utilization is dependent on teachers ……… note of what the programme hopes to achieve
8. Watching of TV programmes should be without ……….
9. In the teaching learning process the ……….. , learning experience, and evaluation are very important.

   a) Curriculum b) Syllabus c) Teacher

4.6 MERITS OF SCHOOL BROADCASTING

Educational Implications of the Radio

Radio has a distinctive role to play due to following reasons.

a. Radio extends the area of acquaintance

The child gains knowledge by coming in contact with the physical world around him with which he is acquainted. This area of personal acquaintance is limited and he does not get the experience about the world outside. But radio does this. It brings the world into the classroom by means of different formats like description, narration,

Notes

dramatization, and storytelling, along with on-the-spot recorded materials, original voice and natural sounds.

Willey and Young have said, as the scope and range of his experience expands, the child is no longer limited by geographical boundaries. Without his being conscious of the process, radio becomes an integral, vital part of his life, linking him immediately and inevitably with a world beyond him. Levenson and Statsheft have remarked that the most isolated classroom can get the world geography over radio. It is translated in such terms which become meaningful to the child. In the words of Forsythe, Radio has the ability to transport listeners around the world, backward or forward in time.

b. It brings people of rare contributions to the learners

Radio brings the people, dead or alive, to the classroom who have made rare contributions to the society. Normally it is not possible on the part of the pupils to hear the voice of such people. In this connection it may cited that the voice of a great scientist, inventor, and / or outstanding writer, poet, musician, and explorer can be heard over radio, giving direct experience to the child.

c. It places events of current nature at the hand of the listener

Radio presents national as well as international events of current nature and thus keeps the pupils informed. The horizon of their knowledge expands. Levenson and Stasheff have observed rightly that "Radio presents and interprets while it is till current before it becomes history, whereas textbooks and magazines cannot do that." As pupils listen to selected news broadcasts and discussions on crucial issues, they become increasingly aware of the complex problems they will encounter as citizens.

d. It helps in inculcating values

Since radio works with voice and sound only, it helps the students in their imagination when exposed to broadcasting. It also acts in stimulating interests of children and extracting creativity in them.

e. It helps slow learners and pupils having poor sight

The pupils listen to the teachers in the classroom. They supplement the learning by going through the books prescribed for the purpose. Since all the children do not equally benefit from the books, they need the assistance of broadcasting. The learners having defective eyesight also get into trouble while reading. For them radio broadcasting becomes helpful in their learning. In this regard, Levenson and Stasheff have quoted that psychologists have noted that not all children learn equally well from the printed word: to some sound is very helpful. To these children, as well as those with poor

sight whose reading habits must be guided, as school without a radio receiver is indeed an educational tragedy.

f. It can be used as a medium to teach all subjects particularly language and music

Notes

Almost every subject can be taught through radio, but the radio is more suitable for certain subjects such as languages and music. These subjects are best taught through radio than television. According to Shukla (1979) Radio specifically can provide opportunities for developing listening comprehension as well as improvement of vocabulary, proper intonation, pronunciation and formalities of speech.

g. It refreshes knowledge of teachers

A broadcast programme when presented carries more content than what is found in textbooks. The programmes also do not confine to single subjects. Hence it helps the teachers to refresh their knowledge on various subjects. Goyal (1985) opines that radio as a medium is attractive and interesting. Its proper provision and use can make teachers resourceful, imaginative, knowledgeable and skilful. It is likely to enhance the quality of teaching.

h. Wide Coverage

Radio covers a wide geographical area and even the schools in remote areas can listen to radio programmes. Mountains, hills, rivers, forests do not come in the way of radio transmission. Radio as a medium can reach a larger target population at a time, ultimately saving time, energy, money and manpower.

i. Cheap Medium

In comparison with other technologies in use in the field of mass education, radio is one of the cheapest technologies.

j. Easy repair and low maintenance

When compared to TV and other devices, radio is easily repairable. The spare parts are available and relatively cheaper Maintenance of a radio is easy and does not require much technical knowledge. It consumes less current and can be operated using battery also.

4.7 LIMITATIONS AND SHORTCOMINGS

Limitations of Radio Broadcasting are presented below;

- It is not a flexible medium-No face to face interaction. It is a one way communication process.
- Provisions for feedback are time consuming.

- It cannot be used effectively for all subjects especially science.
- Production of radio programmes required expertise.
- It is only an auditory presentation and very little of what we hear, we can remember.

Notes

4.8 SUGGESTION FOR EFFECTIVE SCHOOL BROADCASTING PROGRAMMES

The teacher should bestow his attention on the following areas;

i. Environmental awareness
ii. Population Education
iii. Agriculture Education
iv. Nutrition Education
v. Health and Hygienic Education
vi. Political awareness
vii. Rights and responsibilities of a citizen
viii. National integration etc.

Usually the students do not show keen interest listening to the broadcasting programme. They while away their time in gossiping with peers. When the programme is related to English the teachers should apprise them of the coming events prior to the commencement of the programme. The teacher may envisage follow activities by way of giving assignments to the topics broad cast. Suitable may be changes in the timetable should be made in accordance the programme schedule.

4.9 EVALUATION

1. Mass Media has Revolutionised education. Justify.
2. What is the educative value of radio?
3. How would you make use of radio broadcasting?
4. Mass Media will ultimately replace a classroom teacher. Argue.
5. State the educational implications of television programmes.
6. How can newspapers be used in education?
7. Explain concept of mass media.
8. Discuss the educational significance of motion pictures.

4.10 LET US SUM UP

Mass media's major focus is on providing entertainment. In this world of Internet and TV technology, mass media also plays a vital

role in providing Education. In this internet world, mass media plays a prominent role in providing both entertainment and education which is collectively referred to as Edutainment.

Notes

Mass Media is the indispensable tools for educating the masses and communicating new knowledge and information to the education. They can easily reach large number of people. They perform responsible services in the spreading of compulsory education and adult literacy and as such they are very useful media-for making instruction more effective and meaning.

Teaching and learning involves communication between the teacher and the learner through a medium and radio acts as one such medium. Radio is one of the mass communication media which has got a great advantage over the other media.

4.11 UNIT END ACTIVITIES

Describe the role of mass media in teaching and learning.

4.12 POINT FOR DISCUSSION

"Educational radio provides one way communication ". Discuss

4.13 ANSWERS TO CHECK YOUR PROGRESS

1. C
2. A
3. True
4. True
5. False
6. False
7. Explanatory
8. Interruption
9. a)

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UNIT – V MASS MEDIA IN EDUCATION - II

Notes

STRUCTURE

5.1 Introduction

Television that is intended to teach and instruct the viewer is known as Educational Television.TV can be a teacher for learner. Television is a great way to open learner's mind to a variety of things and help them learn about topics they may not be exposed in a classroom. On the other hand, television can reinforce what students learn in school and provide a supplementary method of teaching them about important subjects. Without television, most students would never be able to see amazing things like exotic animals, different cultures, and beautiful cities. When children watch Educational television, they are bound to be influenced by the characters they see. Allowing your students to watch shows with characters who promote positive messages like healthy living and helping others will influence them to make good choices.

While the effects of television on students continue to be debated, there are ways in which you can make television's influence beneficial. Making sure your student is keeping their television time to a minimum and watching shows that are educational can actually help them. Educational television programs can provide them with more

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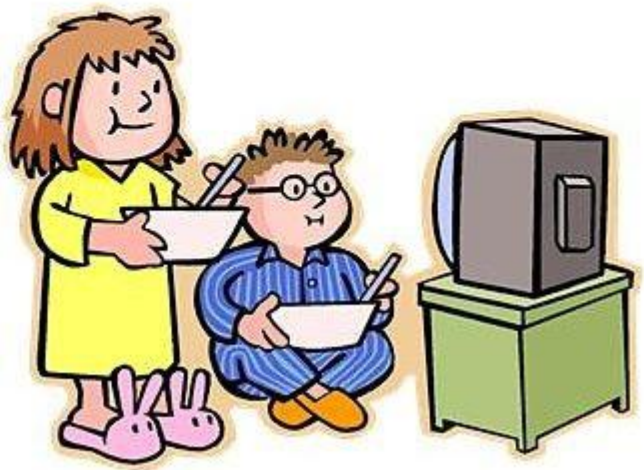
knowledge and greater insight on the world that will help them mature into a well-rounded adult.

5.2 OBJECTIVES

After going through this unit, you will be able to :

- describe the Educational Television
- explain the nature of broadcasting ETV
- understand the Advantages ETV

5.3 ETV (EDUCATIONAL TELEVISION)



i. EDUCATIONAL TELEVISION (ETV) OR INSTRUCTIONAL TELEVISION (ITV)

Educational Television is a system that presents learning content in various subjects produced by an agency. It is a means of providing direct instruction (formal) as well as continuing education (non formal). It has the capacity to bring the world into a class room and classroom into a home. India is a large country with varied climatic conditions, a large and ever growing population and vast tracts of inaccessible remote locations. T.V. as a mass medium has the potential to play a major role in the educational setup of our country.

Wayne Coy calls Educational Television as the "Electronic blackboard of the future" and list the following as the characteristics of ETV.

- Educational Television combines both sensory and auditory experiences.
- It is an extension of the radio broadcasting.
- It offers uniformity of communications.
- It is a versatile education vehicle.

- It stimulates and reinforces ideas.
- It provides live broadcasts of 'on the spot' events.
- It provides a powerful visual medium.
- It is a means for leisure time activities.

Television for instructional purpose was first used in USA. In India, previously television was linked with All India Radio.

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On October 24th, 1968 for the first time in India, school television programmes were started in Delhi on experimental basis The project undertook five lessons weekly in class XI, to telecast on STV programme. Among these five lessons, 3 lessons were from Physics and Chemistry, one lesson from English and one from Hindi. The programmes were arranged according to the syllabus of class XI and were telecast during their allotted time within the school hours.

ii. **Delhi Agriculture Television (DAT) Project**:

DAT project is popularly known as Krishi Darshan. It communicates agricultural information to the farmers. It was first started on January 26,1966. Facilities for improving communities were provided to 80 villages of the "Union Territory of Delhi and all were found to be useful.

iii. **Satellite Instructional Television Experiment (SITE):**

The SITE was first started in the country in August 1975, for a period of one year. Under this experiment, two types of programmes were telecast to 24000 villages, in six states, namely Andhra Pradesh, Bihar, Karnataka, Madhya Pradesh, Orissa and Rajasthan. Types of programme experimented were:

a. Educational programmes in the area of agriculture and other related subjects. It also organized some evening programmes related to community living, such as health, family planning and social education etc.
b. Programme for rural primary school children of the age group of 5 to 12, in different languages like Hindi, Kannada, Oriya and Telugu on each school day
c. Post Site Project: This project was mainly related to the subjects pertaining to the earth and their other related programme. It was first started in Jaipur, on March, 1977.

The purposes of this project were to:

(a) Educate the rural mass about the use of improved scientific method for farming.

(b) Give them knowledge of health and hygiene.

(c) Develop among masses the sense of national and emotional integration, and

(d) Bring awareness of the importance of education and healthy environment, among the rural children.

Notes

iv. **Indian National Satellite and Transmission (INSAT) :**

In 1982, India national Satellite and Transmission system was developed and till now this system provides uninterrupted service to the nation through satellites systems comprising—INSAT 1 series, INSAT 2A, 2B, 2C, and2D.

The Ministry of Education prepared a scheme for creating Educate Television Programme for providing facilities within the education sector a decentralized basis. For this purpose, a Central Institute of Educational Technology (CIET) was established under NCERT and State Institute Educational Technology (SIETs) in six states namely Andhra Pradesh, Gujarat, and Maharashtra, Uttar Pradesh and Orissa.

The objective of the INSAT service is to help the rural and back areas to develop along with the national demand to impart education two different age groups of school children one from 5 to 8 year and other from 9 to 11 years. Higher Education Television Project: (HETV) of UGC: The Education Television Project sponsored by the UGC is popularly known "country-wide-classroom". It marked the beginning on 15th August, UGC has made the entire planning of the programme and the production the programme is accomplishing efficiently.

HETV organized programmes for higher education in different area knowledge at the centre. Some programmes made abroad are also provii to meet the requirement of the learner of India by editing and standardize them to suit their needs.

UGC has establishes Mass Communication Research Centre at differ Universities such as Jamia Milia Islamia, New Delhi, Gujarat Vidyapei Ahmedabad, Roorkee University etc. After the Educational Technology Action Plan 1992, IGNOU made arrangement for a half hour programme on UGC national TV networking. UGC organized 15th Educational Media Research Centers (EMRCs) and Audio Visual Research Centres (AVRCs) to facilitate necessity course material.

Merits of Educational TV

The following are the merits of Educational TV

1. **Maximum learning while witnessing TV programme;** the user make use of both audio and visual senses, hence it maximizes learning

Notes

2. **Direct attention**: Since a TV has the power of attracting child directly to its programme, there exist a direct involvement of the students.
3. **Provides technical advantages**: It provides technical advantages in the classroom by giving illustration and demonstration of various educational programmes which are not possible in general classroom situation.
4. **Economical;** From the point of 'view of time', cost of setting up classroom projection equipment, educational TV is very much cost effective.
5. **Programme through expert teacher**. As the TV lessons are imparted through expert-teachers students get privilege to attend the lecture of expert teacher and can learn the lesson in better way.
6. **Model for the class teacher;** Teachers can enjoy the opportunity of using" the instructional method of-teaching of expert teachers as models for modifying their own method of instruction.
7. **Information;** TV programmes always provides up-to-date information, modifications of old technique of instruction and permission for the inclusion of new equipment or techniques into the classrooms instruction.
8. **Using the teaching aids**; TV programme makes use of various Audio visual teaching aids while teaching a lesson which is not possible for a general class conducted in a school. This facilitates learning content perfectly.
9. **Motivate gifted students;** Gifted children can be more benefitted especially, because, they can learn more advance knowledge than what they can earn usually in the classroom learning.

Limitations of Educational TV

Various limitations of Educational TV are as follows;

1. It is a one way communication.
2. The teacher in the TV cannot have any direct contact with the students who witness TV. Student cannot get clarification if and when doubt occurs, and
3. Most programmes are not related to school curriculum; Telecast is not related to school curriculum, as such most of the lessons imparted through TV are not in relation to student's need.

Notes

5.3.1 CCTV



Fig No.4.1 CCTV

CCTV means close circuit television. The main purpose of CCTV is to make surveillance of what goes on in the classroom, opera, examination hall, and conferences.

Closed-circuit television (CCTV), also known as video surveillance, is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point, point to multipoint, or mesh wireless links. Though almost all video cameras fit this definition, the term is most often surveillance in areas that may need monitoring .

Types of CCTV cameras

1. Dome Camera

Dome Cameras are the most commonly used for indoor security and surveillance applications. The "dome" shape makes it difficult to tell the direction that these cameras are facing. The popularity of these cameras is driven by three major reasons, namely:

Easy installation - Most Dome Cameras require only two or more screws to install. In addition, they can easily be mounted on both horizontal and vertical surfaces such as walls and ceilings.

Vandal-proof feature: The dome-shaped, hardened plastic casing that covers the camera protects it from vandalism.

Infrared Capability: Some of the Dome Cameras come fitted with IR illuminators, which enable the cameras to capture video images in low lighting conditions.

2. Bullet Camera

Bullet Cameras have a long, cylindrical, and tapered shape, similar to that of a "rifle bullet”. These cameras are ideal for outdoor use, particularly in applications that require long distance viewing. Bullet Cameras are usually installed inside protective casings, which protect against dust, dirt, rain, hail and other harmful elements. A

mounting bracket enables the camera to be pointed in the desired direction. The cameras come fitted with either fixed or varifocal lenses.

3. C-mount camera

C-mount cameras come with detachable lenses, and thus allow users to change the lens to fit different applications. For instance, the standard CCTV camera lenses can only cover distances of between 35 and 40ft. With C-mount cameras, it is possible to use special lenses, which can cover distances beyond the 40ft.

Notes

4. Day/Night Camera

The day/night CCTV cameras have the distinct advantage of being capable of operating in both normal and poorly-lit environments. These cameras do not require inbuilt Infrared illuminators because they come with an extra sensitive imaging chip that can capture clear video images in the dark. Hence, the cameras are ideal for outdoor surveillance applications, where IR cameras cannot function optimally.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

1. ………..offer a solution to the teacher to produce a greater impact on the learners.
   a) Audio-Visual ads b) Books c) Computers

True or False

2. Television is one way communication
3. Television cannot supplant a teacher.

Fill in the blanks

4. Television enhances better communication and ………..in the teaching learning process.
5. TV programme utilization is dependent on the …………… of teachers to make use of the programme.

5.4 ROLE OF TEACHER IN SCHOOL TV PROGRAMME

Role of Teacher in Educational Television (ETV)

The five stages in ETV in which a teacher needs to be involved are

Notes

Planning and Preparation of Programme

The ultimate user of the ETV programme is the teacher, hence the teachers role in making decisions regarding the content, matter and sequence is of utmost importance.

i. Production of Programme

The Production of a ETV programme involves a lot of technical knowledge, but the knowledge of the mechanics of production helps him in contributing to the editing and modification stages.

ii. Presentation of Programme

TV presentation required some extra skills other them classroom teaching skills. So a teacher should be competent to present a lesson in the studio.

iii. Utilisation of Programme

The teacher should be able to lead the follow up programme after viewing ends. The teacher has to get the pupils ready to watch a program by providing necessary background information and later on conclude based on observations after viewing of the programme. He should be in a position to clarify doubts and elaborate certain missing links.

iv. Evaluation of the Programme

The teacher should be trained to evaluate all aspects of the program so that he will be in a position to suggest modifications both in content and style of presentation.

5.5 LET US SUM UP

Television, as an instructional aid has the potential of facilitating better communication and retention in the teaching – learning process. Perhaps the potential of television is the greatest unifying force every to act upon man, but to obtain the optimum benefit from it, we must try to find a way to unfetter it, a way to let it operate freely in all educational institutions in the country.

5.6 UNIT END ACTIVITIES

Describe the role of ETV List out the Advantages of ETV in your classroom context.

5.7 POINT FOR DISCUSSION

"Educational T.V should be in an interactive mode". Discuss.

5.8ANSWERS TO CHECK YOUR PROGRESS

1. a)
2. True

3. True
4. Retention
5. Willingness

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Notes

UNIT VI - INFORMATION TECHNOLOGY IN EDUCATION - I

STRUCTURE

6.1 INTRODUCTION

Information is a data which is used in decision making. This definition makes it clear that information helps us in solving so problems, making some decisions or for arriving at some conclusions. The information contains following characteristics:

In the true sense of its term;

i. An information has the receiving and transmitting capacity

ii. Information should be understandable, expressible and interpretable in its underlying meaning accurately, and

iii. Information must be effective for the receivers (who receives it), should help him in making decision, in solving his problem and must have the positive effect on his behaviour.

Information technology shares and interchanges knowledge, mental skills, motor skills and attitudes etc. among the users through the use of electronic mass media. As such there exists the process of communication. To attain success in sharing and interchanging information the users have to perform some activities like receiving (hearing or seeing), accepting, cooperating etc.

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6.2 OBJECTIVES

After going through this unit, you will be able to:

- describe the information Technology
- explain the history of information Technology
- understand the Advantages information Technology
- realize the importance of ICT.

6.3 DEFINITION- INFORMATION TECHNOLOGY

Information technology is a type of technology which performs various types of activities such as collecting, storing, processing, retrieving, using and transmitting this information with maximum accuracy and efficiency in enriching the knowledge of the user in decision making within minimum time.

Information Technology is the technology which provides information at any time anywhere in the world. Computer Technology and Communication Technology together facilitate to provide the information. Very simple definition of Information Technology is “any technology through which one can get information is called Information Technology”. ICT is sometimes used synonymously with IT (for information technology); however, ICT is generally used to represent a broader, more comprehensive list of all components related to computer and digital technologies than IT.

- Electronic collection, editing storage, distribution and presentation of information are known as Information Technology(IT).
- Information technology (IT) is the technology required for information processing. In particular the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information from anywhere, any time.
- Information and Communication Technology (ICT) refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums.
- ICT is used to describe a range of technologies for gathering, storing, retrieving, processing analyzing and transmitting information.

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Thus, Electronic collection, editing storage, distribution and presentation of information are known as Information Technology(IT).Information and communications technology (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audio-visual processing and transmission systems, and network-based control and monitoring functions.

Although ICT is often considered an extended synonym for information technology (IT), its scope is more broad.ICT has more recently been used to describe the convergence of several technologies and the use of common transmission lines carrying very diverse data and communication types and formats.

6.4 IMPORTANCE OF INFORMATION TECHNOLOGY

Various importance of Information and Communication Technology are discussed here under;

1. **Useful for the student**: Students can attain self-improvement by using information and communication technology for their necessary information. They can fulfil their inner uses such as curiosity, inventiveness, creativity etc. by gathering knowledge and information through information and communication technology. They can change their behavioural attitude by expanding their knowledge through this technology. They can develop power of problem solving and decision making by fertilizing their knowledge through knowledge and information from various sources. It helps students in collecting information relating to their curricular and co-curricular areas of education. It helps children in developing speed and accuracy in receiving, transferring and using information. It can help the distance learner and also can help in continuing education.

2. **Useful for the Teacher**: Information and communication technology offer great help to the teacher in their teaching task. It can easily provide them with new knowledge and information in the form of books telecommunication media necessary for their teaching task. As it can provide various self-learning materials or self-devising technology it can help teacher in developing the habit of self learning in learners and can enjoy relief from their work.

3. **A helping hand for the counsellor**: The counsellors, no matter where they are working, may have easy access to various sources of information and can gather up-to date knowledge about guidance and counselling .Thereby they can provide desirable educational, vocational and personal guidance and

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counselling to the students as well as to the parents. The electronic devices available in this technology help in keeping records of different aspects of students. These include records of educational level, interests, aptitudes, attitudes and other personal characteristics of students. It may help teachers for giving further guidance and counselling to the students.

4. **A greater help for Administrators and planners**: Educational administrators and planners may collect up-to-date information regarding development in the field of education, educational administration and planning with the help of information and communication technology. They have easy access to the information regarding the all round functioning of an institution such as working of the teachers, achievements of their students and other information related to the institution. This information helps them in planning their administration properly. It also help them by providing information about the activities of the students, activities performing by the teachers etc Such type of information help the planners to bring modification in the aims and objectives of education in the system of evaluation, and also to make provision of some resources wherever necessary.

5. **Beneficial for Educational Researches**: The process and products of information and communication technology are greatly beneficial for educational researchers. Reliable and up-to-date information are necessary for the researchers which can be properly collected through information and communication technology. Information is the basis of knowledge and for reaching effective educational goals. This information and communication technology can be assumed as the primary vehicle.

6.5 INFORMATION TECHNOLOGY REVOLUTION

Electronics is a bag of tricks. The first digital computers were based on vacuum tube technology. Once the idea of the digital computer merged with that of the transistor and later the integrated circuit, the development of computers became spectacular and continues to this day.

With the fax machine and cellular telephone, PC and satellite dish becoming standard household phrase. The communication evolution has become a household phrase. The consequences of this presumed revolution are conceptualized the globe over as the transformation of our world into a Global Village Paradoxically perhaps this perception of novelty and dramatic change is a very stable one.

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The profile of information and communication technology has brought profound changes in the availability and accessibility of information. The concept of communication revolution as well as the phrase itself became popular in the early 19^{th} century. Samuel Finely, Breese Morse evoke the global village metaphor in the middle of the 19^{th} Century to forecast the potential impact of the technology, he shaped for electric communication. Communication constitutes an end to end process in which all components and their relationships are active and integral. Communication is essentially the circuit like process of linking minds through the transference of information.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

1. .... needs for interacting with others at remote places.

   a) Radio b) Television c) Teleconference

2. ………..is essential for internet connection

   a) Web Browser b) Telephone lines c) Modem d) all the above

3. The concept of communication revolution popular in

   a) 9^{th} Century b) 20^{th} Century c) 21^{st} Century

True or false

4. ICT cannot help the counsellor
5. Quick remedial action is possible with Tele conferencing
6. Administrators and planners are benefited through Tele-conference
7. Electronic Mail Service is an important junction of an internet.

6.6 HISTORY OF INFORMATION TECHNOLOGY

The evolution of Communication Technology is clearly given in the following table;

Table No.5.1 History of I.T

Year	**Invention**
1562	First Monthly Newspaper
1594	First Magazine
1639	Printing Press
1827	Photography on metal plate
1835	Telegraph

1846	High Speed printing
1866	Telegraph cable
1876	Telephone
1888	Radio
1894	Soundless Movie
1895	Motion picture camera
1928	Television, Sound Movie
1939	TV broadcasting
1947	Transistor
1948	Reel – to reel tape recorder
1950	Cable Tv
1952	Transistor Radio
1957	Satellite
1961	Push button Telephones
1968	Portable Video Recorder`
1975	Flat Screen Television
1979	3D TV
1982	Compact Disc
1985	Cellular Phone
1990	Communication Satellite
1991	CD ROM Games
1994	HDTV
1996	Web TV, Web Camera
1998	Full Motor Video
1999	TV Set Top boxes
2000	Digital Phones
2005	Cell phone with transistor

Notes

As ICT is becoming more and more part and parcel of teaching, it would be interesting to see how ICT has developed through the last decade. The term “computer” comes from the Latin “computus” and “computare”. Both Latin words mean to determine by mathematical means or by numerical methods. The English verb “compute” has the same meaning.

The **Internet** was invented as a result of researches conducted in the early 1960s by visionary people like J.C.R. Licklider of MIT. The latter saw the added value of allowing computers to share information on research and development in scientific and military fields. That’s why, he proposed a global network of computers in 1962, and moved over to the Defense Advanced Research Projects Agency (DARPA) in late 1962 to head the work to develop it.While many people use the terms **Internet** and the **Web** interchangeably, they are in fact not synonymous. The Internet is a huge network that connects millions of computers together worldwide. Computers in this network can communicate with any other computer as long as they are connected to the Internet. The Web or the *World Wide Web* (WWW), however, is a way of accessing information over the medium of the Internet. It is an information space or a model that is built on top of the Internet where documents and other web resources are identified by URLs (Uniform Resource Locator), informally termed a web address. This space is interlinked by hypertext links, and can be accessed via the Internet.

The World Wide Web was invented by English scientist Tim Berners-Lee in 1989. He wrote the first web browser in 1990 while employed at CERN in Switzerland.

6.7 EVALUATION

Answer the following Questions:

1. Mention a few importance of Information Technology.
2. How do you define communication?
3. State two characteristics of ICT.
4. Trace the history of Information Technology.

6.8 LET US SUM UP

The present unit has thrown light on the importance of information communication technology, and IT Revalutions. Along with the historical development in information and communication technology.

Information technology is a type of technology which performs various types of activities such as collecting, storing, processing, retrieving, using and transmitting these information’s with maximum

accuracy and efficiency in enriching the knowledge of the user in decision making within minimum time. Information technology shares and interchanges knowledge, mental skills, motor skills and attitudes etc. among the users through the use of electronic mass media. As such there exists the process of communication. To attain success in sharing and interchanging information the users have to perform some activities like receiving (hearing or seeing), accepting, cooperating etc.

6.9 UNIT END ACTIVITIES

Identify various stages in the historical development of ICT

6.10 POINT FOR DISCUSSION

Discuss the issues related to the misuses of ICT by the students.

6.11 ANSWERS TO CHECK YOUR PROGRESS

1. (c)
2. (d)
3. (a)
4. False
5. True
6. True
7. True

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UNIT–VII INFORMATION TECHNOLOGY IN EDUCATION - II

STRUCTURE

7.1 INTRODUCTION

E-learning refers to using electronic applications and processes to learn. e-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. A learning system based on formalised teaching but with the help of electronic resources is known as E-learning. E-learning can also be termed as a network enabled transfer of skills and knowledge, and the delivery of education is made to a large number of recipients at the same or different times. Understanding eLearning is simple. E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom.

Communication technologies are also widely used in e-learning. E-learning tools and technologies used to improve the quality of content are manifold. Software like Flash and PowerPoint will help you make your presentations slick and interesting, with high quality, graphically rich content.The Various Modes of E-learning are as follows;

- Web-based learning.

- Computer-based training. It is training accessed offline on computers.
- CD-ROM based learning.
- Webinars.
- Virtual Classroom.
- Mobile Learning.
- Video-based Learning.

In this unit we will discuss about the concept of Cybernetic, E-Learning, and role of internet in teaching and learning.

7.2 CYBERNETICS

Cybernetics is the science of communication and control, especially concerned with comparing human and animal brains with machines and electronic devices. The term cybernetics is derived from the Greek word, which means ‘steerman’. It was first used by Wiener in 1948. This calls attention to the principle of control through feedback. The term feedback is used in a broader sense as a system.

7.2.1 MEANING OF CYBERNETICS

Cybernetics is the scientific study of how people, animals, and machines control and communicate information. Cybernetics has been defined in a variety of ways, by a variety of people, from a variety of disciplines.

It is a "Science concerned with the study of systems of any nature which are capable of receiving, storing and processing information so as to use it for control." — A. N. Kolmogorov.

Cybernetics is a system of tightly knit network of a number of components each functioning in collaboration with another and thus giving a definite shape to teaching-learning process. The human beings are conceptualized in engineering terms like a machine which controls and modifies its own behavior. An individual is viewed as a “feedback system” generation its own activities in order to detect and control specific stimulus. Thus, the cybernetic approach focuses on two aspects: dynamic feedback and auto-regulation. Nowadays, especially with the advent of computers, the concept of feedback control is being more widely used in teaching-learning and training.

The main functions of feedback mechanism in cybernetic approach are:

- It generates actions of the system towards a goal set before the teachers and students.

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- The effect of this action is compared with the most appropriate way to detect deficiencies to meet the goals.
- It utilizes the deficiency / error signals to redirect the system.
- These functions reflect on the three generalized components of cybernetic approach viz., an action mechanism, a feedback detection system and a director which translates the feedback signals into corrective action.

7.2.2 CYBERNETICS AND EDUCATION

Cybernetic approach thus has the following applications in education:

- Feedback theory in cybernetics approach brings out the concept of self-instruction.
- Flow of continuous feedback as input makes the students an independent of autonomous leaner.
- Self – regulating feedback reinforces students' motivation for learning-the ultimate objective of any teaching-learning design.
- The approach is also effective to improve learning of the students studying either in classroom situation or pursuing individualized instruction.
- This approach enables the teachers and students to have full control on their learning and hence the way to achieve the pre-stated performance standards in the form of objectives.
- It provides the basis for independent learning and leads to the preparation of self-instruction materials in the form of printed texts, audio or video programmes for distance learners.
- programmes for distance learners.

7.3 E – LEARNING

The most striking innovation in the field of Educational Technology is E-learning. Electronic Learning is popularly known as E-learning which utilizes electronic resources in teaching and learning.

Electronic-learning is a state-of-the-art technology of education that implies self-motivation, communication, efficiency, and technology. Because there is limited social interaction, students must keep themselves motivated. E-learning is effective as it eliminates distances and subsequent commutes. Distance is eliminated because the e-learning content is designed with media that can be accessed from properly equipped computers, and other means of internet accessible technology.

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E-learning has its own advantages and disadvantages. However, the most important advantages lay in the reduction of time, efforts and cost, adding too which the capability of the computer in improving the general level of studying achievement and in helping the teacher and the student in providing an attractive educational environment which does not depend on place or time.

Furthermore, we can talk about the following advantages of E-learning with the increasing of communication between the student and themselves and between the student and the school a fast and easy way is needed to bring everybody together. So from the midst of confusion came e-learning to make their lives easy throughout different directions such as discussing forums, e-mail, and chat rooms. Moreover, researchers think that these things increase and motivate students to participate and react with the subjects in question. There is also the matter of sharing points of views. So the discussing forums and chat rooms provide opportunities to exchange and share the point of views in respect of the subjects in question, the matter which increases the opportunities of making use of the opinions and suggestions of the others, which in turn, will help in making a strong background at the learner through what he /she got of knowledge and skills from the chat rooms.

Some of other advantages of E-learning are listed below;

1. It is effective and efficient due to its ease of access and the progress is being determined by the learner.
2. E-learning system student- centred learning, and
3. It facilitates constructive Pedagogy

Limitations of E-learning

- It requires basic ICT skills
- The role of physical teacher is minimized
- It needs self-regulation and self –discipline, and
- Availability of E-Resources is a major constraint

7.4 INTERNET

Internet is a network of computer linking the world as a whole. It is popularly known as Net. It consists of thousands of computer networks interconnected by a dedicated, special-purpose computers called routers. Each computer attached to the internet is assigned a unique LP address in the form of a number. Software uses the address

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to identify the intended recipient when it sends a message. An internet address is also called an IP address.

The internet uses an approach that allows each group of technology to select the network technology that best meets the group's needs. To accommodate multiple network types, the Internet provides a mechanism to interconnect arbitrary networks and the software to transfer data across the connections.

Computer software forms an important part of the technology that makes it possible to interconnect networks. Advanced Research Projects Agency's (ARPA) Internet project produced many innovations to make networking more general and efficient.

Advantages of Internet

1. Internet can be used for exchange e-mails with many people having e-mail addresses. .
2. Millions of files stored in the computer throughout the world can be searched, retrieved and read literally through Internet.
3. Internet helps in performing the activities like sending or receiving sound animations and picture files from very distant places.
4. Looking into something through resources of private or public information services that are on the internet is possible.
5. Immediate communication with others, connected with the Internet is possible.
6. It possesses enormous possibilities for diverse use.

Limitations of Internet

Internet has some disadvantages too. People who spend too much time at their homes (because they needn't go anywhere, they can do everything using Internet) are getting weaker. Sitting a for long time is also harmful to the spine. Another disadvantage is that Internet can by addictive. Some of other disadvantages are listed below;

1. Availability of high speed networking system is a major constrains in our country. But in some village areas the net connection is not established.

2. Internet provides heap of information, it is in the hands of the learners to identify the relevant information suitable for them.

3. Sometimes irrelevant information may cause irritation among learners.

4. Phobia is the most pervasive emotion associated with online learning.

5. Anti-social information available in the internet may affect the personality of the learners.

7.5 ROLE OF INTERNET IN TEACHING AND LEARNING

Notes

The following are the role of interest in teaching and learning;

1. The internet offers an interconnecting mode between Universities and Research Laboratories: The National Science Foundation (NSF) of the American Government set up five super computer centres, nearly at the end of 1980 which started its function as the main interconnecting made of connection between University and Research Laboratory Network.
   In 1990, the Department of Electronics (DoE) of the Government of India in collaboration with the United Nations Development Program established the internet of India, which is popularly known as internet is the abbreviation of Educational Research network, which opened the internet communication to India in the field of education.

2. Application of the Internet in the Library System: Application of the Internet in the servicing system of the library makes it a global digital library. The common meaning of a digital library is a large store house of digital information accessible through the compute. There are various index mechanisms in the digital library system. To get information from the digital library the user has to proceed through these mechanisms. A digital library can contain text, sounds, graphic images, still and moving pictures and conferences which are very much essential for students who use it.

3. Electronic Bulletin Board Service. This is a well known service of the internet. It allows an individual to take part in one or more discussion group of his internet. It allows the participants to post a message for other members of the group to seeIt can propagate messages quickly among the subscribers. The usability of the electronic bulletin board permits an individual.

   - To listen to a conversation.
   - To ask questions.
   - To interject a clarification of a previous statement, occasionally.

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- To contribute some statement.

4. E-mail: A computer can transfer small notes or large documents across a network instantaneously. This new form of communication is known as electronic-mail or e-mail. The E-mail can be used as an accessor to a variety of remote services. A computer cannot receive an e-mail unless it has an e-mail service program running. E-mail or electronic mail proves itself to be the biggest asset in sending and receiving messages instantly from one computer to another. As the e-mail includes text, graphics, and voice for transferring documents; it can provide immense help in the field of education.

5. On-line education: On line instruction is a technological development in the field of education. It is also known as the distance education mode of technology. It includes satellite courses, computer-based program, video- instructions, educational television, correspondence or home study courses. It lays emphasis on providing educational opportunities to those students, who are unable to get their desired courses of education for some personal or social problems or due to the unavailability of desired courses nearby. On line educational makes use of available media. It represents a learning domain which is independent both from the point of view of place and time and it provides for many way communications.

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

Fill in the blank.

1. Collected information should be …………
2. The sources of information should be ……. to the users

True or False.

3.It is possible to communicate with many people at a time using electronic-mail.

4.Electronic mail can be used to transfer documents or recorded audio- messages.

Choose the best Answer

5. .... is the most pervasive emotion associated with online learning.
   a) Frustration b) Enthusiasm c) Stress d) Phobia

7.6 EVALUATION

Answer the following Questions:

Define Cybernetics.

1. What are the applications of Cybernetics.
2. State two advantages of Internet

Notes

7.7 LET US SUM UP

The present unit has thrown light on the meaning of cybernetics-Learning and use of internet. Along with latest development in communication system.

Cybernetics is thus a system of tightly knit network of a number of components each functioning in collaboration with another and thus giving a definite shape to teaching-learning process**.** Internet is a network of computer linking the world as a whole. It is popularly known as Net. It consists of thousands of computer networks interconnected by a dedicated, special-purpose computers called routers. Each computer attached to the internet is assigned a unique LP address in the form of a number. Software uses the address to identify the intended recipient when it sends a message. An internet address is also called an IP address. The internet uses an approach that allows each group of technology to select the network technology that best meets the group's needs. To accommodate multiple network types, the Internet provides a mechanism to interconnect arbitrary networks and the software to transfer data across the connections.

7.8 UNIT END ACTIVITIES

Identify the Various E-Resources available in your school or in your area.

7.9 POINT FOR DISCUSSION

Discuss the measures to be taken to enhance the knowledge of students making use of internet

7.10 ANSWERS TO CHECK YOUR PROGRESS

a) Accurate andreliable
b) Accessible
c) True
d) Trues
e) E

Notes

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UNIT VIII - MEDIA SELECTION AND INTEGRATION

Notes

STRUCTURE

8.1 INTRODUCTION

According to Bates (1995), "mediums a form of communication associated with particular ways of representing knowledge". Clark classified the social-psychological definitions of educational media as vehicles, vehicles plus teaching method, and learning context. Media is also viewed as context where education occurs, much like research on schools or homes as settings for educational experiences (2001).Lambert Gardiner (2002) categorizes the exploration of media into four generations. The first generation, memory and speech, is the media type that is just done by people. The second generation of media is print and film, which was invented in last century. With a big shift, the previous generations assimilated with the new generation telephone and television. After a while the speed of the progress in media development was incredible and the fourth generation, multimedia and the Internet, became popular. It seems that the fifth generation is the multifunctional mobiles and web systems.

The knowledge of various media is of great help to a teacher while transacting learning experiences. It is very difficult on the part of a teacher to judge which medium out of an array of media is the best for a given instructional task. Hence, comes the importance selection of how media and their integration in the instructional process. In this unit, we focus on why and how various media are employed in the teaching-learning process.

8.2 OBJECTIVES

After going through this unit you will be able to explain the learning styles

- Explain the term Media
- Realize the need for media selection
- Understand the concept of multimedia and multiple media
- Bring out the importance of Multimedia

8.3 MEDIA AND INSTRUCTIONAL PROCESS

Instruction is a process of furnishing a controlled environment consisting of various components with which learners interact and gain experience, leading to the attainment of certain pre-specified learning outcomes or instructional objectives. The components which constitute instructional environment are (a) content or learning experiences; (b) teacher or provider of learning experiences; (c) methods and media which are means of providing learning, experiences; (d) learner is also a part of this instructional environment when learning takes place. Let us look at Figure 6.1 and understand how learning takes place.

Instructional Environment

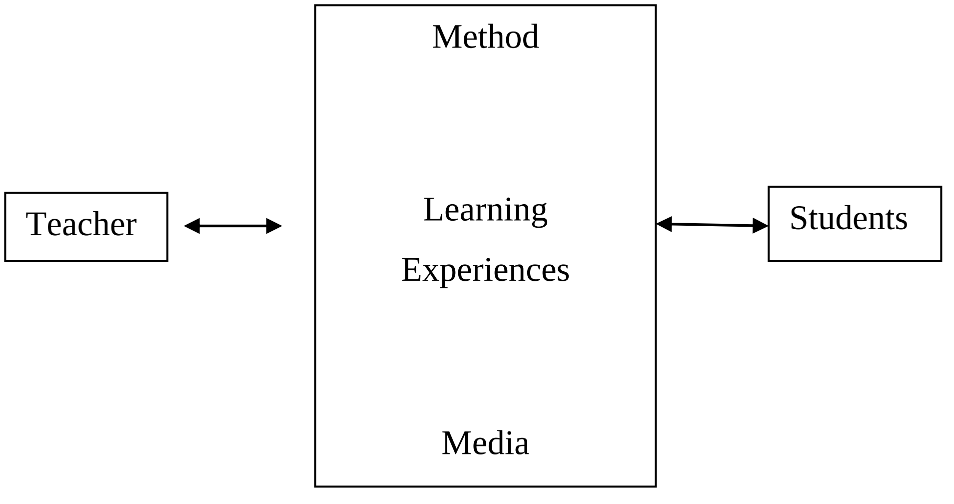


Fig 8.1 Components of an instructional Environment

Notes

The main objective of carrying out any instructional activity is to provide learning experiences to the learners. To carry out those activities, a teacher decides instructional objectives, identifies learning experiences, transacts these learning experiences in an instructional environment and evaluates the attainment of instructional objectives or learning outcomes by the learner. Transaction of learning experiences means transaction of a given content. In order to transact a given content, a teacher takes the help of some methods. These methods may be teacher controlled; learner controlled or group controlled methods.

A teacher can go for teacher controlled methods like lectures, demonstrations, learner controlled methods like PLM, project work, library work, etc. or group controlled method like debates, discussions, seminars, panel discussions, etc. Through all these methods a teacher tries to give direct learning experiences. A teacher can give a learner direct experience with the objects of instruction. When he/she desiresto illustrate something about objects or processes, he or she can perform a demonstration using the actual objects and communicate orally the points he or she wishes to make. For example, he or she can teach compounds and mixtures to high school student by mixing up different chemicals.

Thus use of various methods, techniques alone does not come to the rescue a teacher in the transaction learning experiences. There are many events of instruction which require use of media — audio, visual and audio-visual. For example, it is too difficult or expensive in cases to have actual objects under study in the classroom. Hence, a teacher often uses visual medium to represent the objects, either photographs or figures. The learning experience provided through media, thus, becomes mediated experience. Each medium is effective specific learning tasks and with specific learner groups. Thus various media make types of learning tasks easier. In other words, various media facilitate a teacher in the trail of learning experiences.

8.4 NEED OF MEDIA SELECTION

In educational environment media selection is the process of choosing the most cost-effective media for education, to achieve the required coverage and number of exposures in a target audience. The attempt to select the best combination of media for education is an ongoing process, in all parts of the world. Classroom teachers are deciding what methods are best to get the information they are about to teach to their students, if they should use video, computer or still picture, in explaining a given task. Those decisions will have comparatively little impact on the educational system as a whole

although they may make a great difference in an individual class (Scramm 1977).

Notes

India had been using mostly what could be called Little Media - puppets, filmstrips, and radio to reach to its largely illiterate village people. In 1976 the Indian government made the decision to change the method of reaching this illiterate people and took up using a satellite (AST-6) with which to beam educational and development television into 2,400 of its remote villages. From puppets to direct satellite broadcasting is 5,000 years in time and millions of dollars in cost (Scramm, 1977).

In the selection of the instructional media, Romiszowski(1997) says that the main categories of factors that may influence the choice of media are:

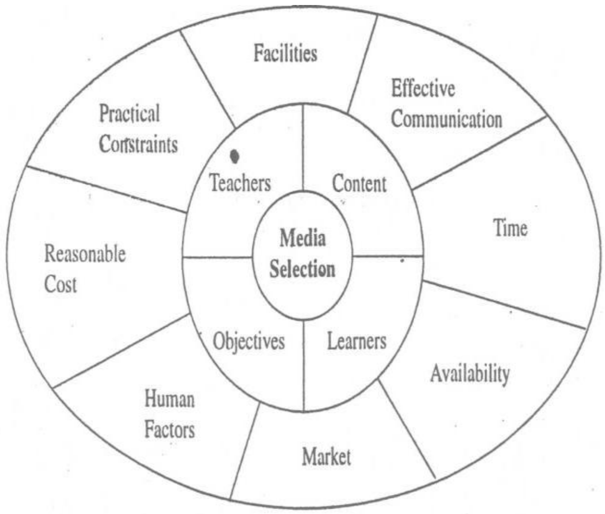
1. Task factors- the type of objectives, and hence the type of learning activities which should be provided for the learner.
2. Learner factors- some learners may learn better from certain media than from others, and
3. Economics/availability factors- this may limit the choice in practice.

Thus, media have an important role in the learning process. But, all media are not suitable or appropriate for all types of instruction. Each medium has its own capabilities or attributes. Attributes are pictorial representation .of Size (enlarged, reduced or real), Colour (black and white, limited colours, Movement (still, semi-motion, full motion), Language (print or oral sounds) and Sound- Media Selection and Integration picture relationship (silent or with sound). Each instructional task also requires media with specified characteristics or attributes. It is therefore considered that media selection is an important part of instructional design and delivery. But it is very difficult on the part of a teacher to judge which medium out of the available media is the best for a given instructional task. A teacher, therefore, contemplates various factors which affect media selection for the transaction of learning experiences.

8.5 FACTORS AFFECTING MEDIA SELECTION

There are many factors as well as approaches of selecting media. The simplest approach is the use of whatever media are available with a teacher. He/she can pick choose any of these available

Notes



2: Factors affecting the process of media selection Source ; Romiszowski,

media for carrying out a teaching activity. But sometimes, it is felt that some media are inappropriate for some objectives. It means that we reject these media and select others which are appropriate for our instructional objectives. This approach is called 'Selection by Rejection'. Although these are some examples of media selection, there are definite factors which govern the process of media selection.

While selecting media for instructional purposes, the following (a) What instructional methods are we adopting? (b) What are the learning tasks we are going to provide the learners? (c) What are the special characteristics of the learners? Apart from these basic concerns, there are also other factors which contribute to the media selection. Do the teachers and the learners have favourable attitude to the medium going to be used for instructional use? What is the cost of the medium? Is it user friendly? Does the medium effectively communicate the message? Is it available as well as accessible to the teacher and students? Questions such as these have to be taken into consideration in the selection of media. Several authors have given different models of media selection. Among them the model given by Romizcowski (1981) is widely quoted. His model covers most factors of media selection.

All the factors which contribute to the media selection may be categorised into the following:

1. Pedagogical Utility
2. Human Factors
3. Availability and Accessibility

Notes

4. User Friendly
5. Cost
6. Effective Communication
7. Infrastructural Facilities
8. Time
9. Hardware.

Pedagogic Utility

This factor relates to two aspects: First, the instructional objectives to be achieved at the end of the instructional process. Second, content or learning experiences to be transacted during the instructional process. Instructional objectives mainly pertain to three domains of Bloom's Taxonomy of objectives. These are: Cognitive Domain, Affective Domain and Psycho-motor Domain. Content includes concepts, facts, figures, principles, procedures, propositions, attitudinal changes, skill development, etc. Therefore, a teacher has to identify media in terms of the content he/she wishes to provide to students for the intended instructional objectives. Let us examine various media which can be used for furthering learners' development in each of these domains.

Cognitive Domain (Factual information, visual identification, concept formation, principle/ rule learning, learning procedures, etc.)

- Chalkboard, Marker board
- Drawings, charts, maps, flip-chart etc.
- Print-textbooks, short readings manuals, workbooks, handouts, articles etc.
- Model, real objects, simulators
- Slides, filmstrips
- OHP transparencies
- Individualized instruction through CAL/CAI, audio tape etc.
- Live instruction—through classroom lecture, demonstration
- TV and CCTV
- Video tape and Film
- Telecast and Broadcast
- Interactive - video
- Teleconferencing

- Computer Conferencing

Affective Domain (Development of attitudes, interest, opinion, motivation etc.)

- Chalkboard
- Flip-chart
- TV, film and video tape
- Audio tape
- Telecast and Broadcast
- Slides/Sound
- Live Instruction—classroom lecture, demonstration
- Simulation and Role-play
- Telephone teaching
- Audio-Video conferencing
- Computer conferencing

Psychomotor Domain (Development of psychomotor skills and skill coordination)

- Media Selection and Integration
- Live classroom demonstration
- Drawing, paintings
- Model, real object
- Chalkboard drawings
- Audio tape—skills through listening
- Film/TV/Video tape — for demonstration of processes leading to skill development
- Language laboratory for developing auditory discrimination and listening comprehension
- Computer simulation/animation, CAL/CAI, computer conferencing
- Audio and Video conferencing.

Notes

Human Factors

Human factors concerned with the selection of media are the teacher who uses media for teaching purposes and the learner who uses for learning purposes. So far as a teacher is considered he/she should have favourable attitude towards the use of media in teaching-learning process. Some teachers are very comfortable with certain media, while they find difficulty in others. All this are due to lack of proper orientation or training of the teachers in the use of various media. Hence, a teacher's attitude and orientation in media compels him/her to select one medium or other.

Likewise learner factor also plays a great role in media selection. Learners bring to every instructional situation a set of capabilities for learning. These include prior information about the particular subject and basic intellectual skills to decode and process the new material. Learners interact in many ways to influence the choice of media. For example, learners with low ability are more benefited from a highly structured mediated instruction, whereas learners with high ability are profited from unstructured presentation in which they can control the presentation and construct meaning of the material (Johnston, 1987).

Availability and Accessibility

A teacher, who decides to use any media for instructional purposes, should take into account their availability both inside and outside the institution. In schools, there are learning resource centres. These resource centres are equipped with various teaching and electronic media. The teacher can ascertain that the intended media are available there. If not available, he/she should explore the possibility of their availability outside the institution. Sometimes, certain media may not be available to a teacher. In such situations, the teacher can look for substitutions. For example, the book substitutes the age-old teacher, a TV programme substitutes a film. Therefore, the teacher should not be desperate if a particular medium is not available, but think of alternatives to achieve the desired objectives.

The availability of media even does not ensure selection of media. Available media should be accessible to the users. Accessibility means that the teacher is able to access the media for teaching purpose and the learner for learning purpose. Now-a-days, many schools are provided with televisions and computer sets. Though they are available in schools, they cannot be accessed either by teachers or the learners due to some reason. For example, the head of the institutions may not allow others to use their gadgets.

Presently many students are enrolled in National Open School and State Open Schools to complete secondary and higher secondary education, Open schooling which adopts distance education methodology uses multi-media approach that includes different media.

Notes

Students of this system must have access to their media either at homes or in a local study centre dedicated to open learning, or at a local public institution that shares its facilities, or at their place of work. Therefore, availability and accessibility to both teachers and learners are two important considerations for media selection.

Cost

Cost or affordability is an important consideration in media selection. The instructional objective for an instructional task may be achieved with the help of alternative media. But, the choice of media depends on how much the user can afford to get such media. For example, a teacher can buy/rent a film on how Indian Parliament functions provided he/she has the budget to do that. Otherwise, he/she has to depend on the print medium. Costs related to media are capital costs, production costs, recurrent costs and variable costs. Here is a brief look at what these costs are and how they affect the budget:

Capital Costs: Capital costs are initial expenditure the institution incurs for the establishment of either a studio or a computing network or obtaining necessary hardware equipment.

Production Costs: These costs are related to the production of instructional material. Production costs vary from one instructional material to another. Fixed costs for one hour of instructional material have been estimated as follows:

Face-to-face lecture	1 unit
Audio cassette/Radio/Teleconference	2 units
Televised lecture	2-5 units
Computer-mediated communication	2-5 units
Print	2-10 units
High-quality television programme	20-50 units
Pre-programmed computer-based learning	20-50 units
Computer-controlled video disc	50-100 units

Recurrent Costs: These costs are required to maintain and manage media. For example, teleconferencing requires a high cost of maintenance because the production staff is required to operate the equipment.

Variable Costs: These costs are linked with the increase or decrease in the use of media. For example, if the audio cassettes are used by many people, their costs come down. Audio cassettes and radio have low

fixed and low variable costs whereas broadcast television has high fixed cost and low variable costs.

Effective Communication

Effective communication is an essential factor in the process of media selection. While selecting any media, one has to look into the fact that the medium selected is able to communicate the intended message or information effectively. If the medium does not communicate the message effectively, use of such medium in the instructional process is meaningless. For example, while teaching growth of population in India during the five years, you use a bar graph. The bar graph should be able to clearly convey the information regarding the growth of population during the last five years. Therefore, the teacher should take enough care to produce the medium so that it communicates effectively.

Infrastructure Facilities

Use of media for teaching-learning activities requires adequate infrastructure facilities. Infrastructure facilities like table, chair, electric supply etc. should be available in the classroom or any specific place where media are to be used. For example, while using OHP in your teaching, you must ensure that the classroom has a table on which the OHP can be kept. There should be electric power point for supplying electricity to the OHP. There also should be a white surface or a white screen on which the projection can be made.

Time

Time is an important factor in the selection of media. There is a scheduled time for any class which may range from 35 minutes to one hour. While selecting any media, instruction for a teacher has to look into how much time a medium requires for better presentation. For example, in a class period of 30 minutes, a teacher earmarks 10 minutes for the use of an audio programme. If, he/she gets the audio programme of 10 minutes, he/she can fruitfully use the programme in his/her teaching. But instead if he has a film of two hours duration he would not be able to show it to the classroom at that stage. Therefore, the teacher has to take into account the time factor in the selection of media.

Hardware

Most of the educational technology hardware are in the form of electronic gadgets. It is evident that innovations are always taking place in all types of electronic gadgets. As a result, we happen to get more sophisticated gadgets from time to time. Hence, it is important that while selecting any educational technology/hardware a teacher should

look into certain aspects. The media selected should be safe and durable. They should also be compatible with the existing equipment. If you go for any sophisticated media, you should ensure that adequate maintenance service along with spare parts of the gadgets are easily available in the market.

Notes

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

Fill in the blanks

1. **……….** is concerned with instructional and content
2. **………..** is a factor affecting media selection.

Write true or false

3. Adequate infrastructure facilities are not needed for media teaching learning activities.
4. Effective communication is not feasible with media teaching.
5. Hardware are in the form of
   a) Electronic gadgets b) Machines c) CD's
6. for efficient analysis ……. Is suitable
   a) Lecturing b) telephone tutoring
   c) Computer conferencing d) face to face tutoring

8.6 HOW TO SELECT MEDIA

In an international setting, media can be selected and evaluated based on the following CASCOIME criteria:

Cost - Is the medium cost effective? Can it reach a wide enough audience? What technology infrastructure is currently available?

Accessibility – Is the medium accessible? Does it facilitate distribution? Is it convenient to use? Is it user-friendly?

Social-Political Suitability – Is the medium socially and politically suitable? Does its use coincide with social and political agendas of governing bodies?

Cultural Friendliness – Is the medium culturally appropriate? Does it coincide with the culture's traditional way of learning?

Openness/Flexibility – Is the medium flexible? Does it foster collaboration? Does it foster different ways of teaching?

Notes

Interactivity - Is the medium interactive? Does it promote learner-learner and learner-instructor interaction? Does it facilitate timely and quality feedback from instructors and tutors?

Motivational Value - Is the medium motivating? Does it encourage learners to study harder and longer?

Effectiveness - Is the medium effective? Does it help students learn content faster (i.e., more efficiently)?

Selection of media is governed by the kind of learning experiences or content knowledge a teacher intends to provide his/her students. For example, most media can handle abstract knowledge, but there are some such as television that are excellent for representing concrete knowledge. Media also differs in the extent to which they can help to develop different skills. This is related to the control characteristics and the representation features of the medium. For example, television, videos and computers are excellent media for imparting skill education. A teacher therefore, requires a good understanding of what is required to teach a particular subject, confined with knowledge of the pedagogic strengths and weaknesses of different media. Rowntree (1994) has given a Chart which suggests the more common media might best enable your learners to perform a given learning task.

8.7 MEDIA INTEGRATION

Integration (from the Latin integer, meaning whole or entire) generally means combining parts so that they work together or form a whole. In information technology, there are several common usages:

Integrated media is a new form of media content creation that cohesively integrates content and context across multiple platforms, such as web, film, print, audio, live event, etc. Media Integration includes traditional content, branding, branded content, storytelling, advertising, product packaging, and more.

User Friendliness, Control and Interactivity Media should be easy to operate and handle by their users. The operations of media should not be so complex that the users have to depend on technical people for their management. Many a times, it so happens that even if someone is interested to use certain media, he may not be able to use it because handling of media requires technical experiences. In other words, media to be used should be friendly with the users.

The users, namely, teachers and learners, must exercise control over media. Suppose a learner is learning-receiving messages transmitted through a textbook or an audio tape or through slides where he can adjust the speed of reading according to his needs, or stop the

presentation, repeat it again, etc. The user should be able to control media according to requirements.

Notes

Similarly, a teacher can avail of media like audio tape, video tape or computer programmes in his/her teaching and control the media according to the requirements during teaching. Learners do have more control over permanent media like books, cassettes and computers than over ephemeral media like lectures or broadcasts. This control enables learners to learn from media more effectively.

'Interactivity' refers to the ability of the learner to respond to the media and obtain feedback on the response. This enhances student learning to a great extent. There are two kinds of interactivity:

Learning material interactivity: This means learner interacts with the medium, gets feedback from it and the medium accommodates learners own input and direction.

Social interactivity: Learners interaction with teachers and with each other via the medium. For example, in teleconferencing, learners situated in different locations interact with each other through this new technology.

8.8 MULTIMEDIA AND MULTIPLE MEDIA

Multimedia refers to content that uses a combination of different content forms. This contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms.

Multimedia is usually recorded and played, displayed, or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. Multimedia devices are electronic media devices used to store and experience multimedia content. Multimedia is distinguished from mixed media in fine art; by including audio, for example, it has a broader scope. The term "rich media" is synonymous for interactive multimedia. Hypermedia can be considered one particular multimedia application.

We can integrate more than one medium into our teaching, we call it media mix or use of multiple media or multimedia. But due to the advancement of technology one may not take the help of a number of media to be integrated with teaching. A single medium can consists of features of more than one medium. Such media are called multimedia. For example the advanced computers are called Multimedia computer.

Notes

These computers comprise text, data, sound animation, visual, picture graphics and interaction. Therefore the use of a single multimedia computer in the instructional process fulfills the requirements of many media. The components of a multimedia is given in the Figure.

Multimedia presentations are those that are assembled or authored inside the computer and played by it on a monitor or projection screen whereas multiple media presentations are however, assembled outside and played from many devices using their own display apparatus.

Multiplemedia refer to large scale presentation that uses multiple presentation media – slide projectors and video- integrated in a single programme.

Multimedia is the field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally. Thus a **Multimedia a**pplication is an application which uses a collection of **multiple media** sources e.g. text, graphics, images, sound/audio, animation and/or video.

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

7. **……** is a process of providing a controlled environment to the learners to gain experience.
8. ………..are pictorial representation size, colour movement and language.

Say True or False

9. Media should process user friendliness control and interactivity
10. Multiple media uses only one media
11. ________ words per minute are to be typed to main psychomotor skill concerned with media

    a. 30 b. 50 c. 40
12. ______ is to be determined in which the objectives can be classified

8.9 EVALUATION

- What is the need for selection of media?
- Describe the factors affecting media selection?

- How will you select the media?
- Differentiate between multi media and multiple media?

8.10 LET US SUM UP

In this unit focus of media selection and integration was done along with discussion of the importance of media in the instructional process. Media constitutes an important component of the instructional environment. It is rather difficult to make a decision of the best medium for a given instructional task. Therefore, one has to select media on the basis of several factors. These are pedagogic utility human factors, availability and accessibility user friendliness, interactivity, cost effective communication, infrastructure facilities, time and hardware aspects. We also mentioned the steps media selection. Difference between multiple media and multimedia has been highlighted.

Notes

8.11 UNIT END ACTIVITY

Give a suitable example of media integration on the topic population explosion.

8.12 POINT FOR DISCUSSION

What factors will you consider of selection of media

8.13 ANSWERS TO CHECK YOUR PROGRESS

1.	Pedagogic utility	7.	Instruction
2.	Cost	8.	Attributes
3.	False	9.	True
4.	False	10.	False
5.	A	11.	C
6.	D	12.	A

Notes

8.14 SUGGESTED READINGS/REFERENCES

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Notes

UNIT IX - APPLICATION TO COMPUTER PROGRAMMES - I

STRUCTURE

9.1 INTRODUCTION

Computer is an electronic device that solves problems by applying prescribed operations on data entered into it. Functions of computers in different areas can be categorized as control, communication, simulation, designing and artificial intelligence. Teaching-learning process is at the heart of any educational system and the process is basically a communication process. If function of a computer are harnessed to its full extent it can help a teacher in making the teaching-learning process more effective than with the use of any other media. For this, a lot of educational courseware for students is needed to be developed.

Computer-based education (CBE) and computer-based instruction (CBI) are the broadest terms and can refer to virtually any kind of computer use in educational settings. Computer-assisted instruction (CAI) Computer Aided Instruction (CAI) is a narrower term and most often refers to drill-and-practice, tutorial, or simulation activities. Computer-managed instruction (CMI) Computer-managed instruction is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, record keeping, progress tracking, and assessment of learner performance. Computer based tools and applications are used to assist the teacher or school

administrator in the management of the learner and instructional process.CAL is a self-instructional activity in which the computer is used as a medium. However CAL is one of the approaches to the use of computers in education. These approaches are named CBI, CML, CAI, CAL. The same are discussed in the following paragraphs:

Notes

9.2 OBJECTIVES

After going through this unit you will be able to explain the learning styles

- Explain the CBT
- Describe the need for CMI
- Realize the Advantages of CMI
- Understand the modes of CAI
- Apply the knowledge of CAI in the class room

9.2 APPROACHES TO THE USE OF COMPUTERS IN EDUCATION

9.2.1 COMPUTER BASED TRAINING (CBT)

Computer-Based Training (CBT) involves the use of a personal or networked computer for the delivery and access of training programs. Computer-based training (CBT) is any course of instruction whose primary means of delivery is a computer. A CBT courseware may be delivered via a software product installed on a single computer, through a corporate or educational intranet, or over the Internet as Web-based training. CBT can be used to teach almost any conceivable subject, but it is especially popular for computer-related studies. Learners often take advantage of CBT to learn how to run a particular computer application, such as Microsoft Excel, or to learn a computer programming language, such as Visual Basic. CBT can be synchronous and asynchronous, as well as online, web-based, mobile, and distance learning.CBT is concerned with the training, which aims at achieving various skills. Teaching is not necessarily directly related to vocational requirements, whereas training relates to specific tasks within the real world. Hence, CBT mainly relates to any job- performance.

It is a computer-based training, a type of education in which the student learns by executing special training programs on a computer. CBT is especially effective for training people to use computer applications because the CBT program can be integrated with the applications so that students can practice using the application as they learn. Many PC applications now come with some modest form of CBT, often called a tutorial.

Definition of CBT

CBT is a: "… a broad generic term to describe how computer-run software can be used in support of training applications. These may include initial training or for imparting or reinforcing underpinning knowledge".- The Nautical Institute

Notes

Furthermore, Dumbleton, (2001) gave a specific definition of CBT are courses which: 1. Are used by students without the need for support or assistance by instructors. 2. Have built in assessment and produce records of the training time and the student identification. 3. Are interactive. 4. Use multimedia technology. 5. Are run on standalone PCs, networked computers, the Internet, or corporate Intranets. 6. Are run aboard ship or at shore side locations.

However, Eldridge, (2000,) defines CBT as: "… simply another means of delivering good quality training. If we treat it as a separate issue, we are in danger of giving it more than deserves".

The former two definitions give a broad view, in the author's mind, as to how learners, seafarers, and instructors describe CBT. Thus, we may consider CBT as an interactive training using the computer as a delivery medium. The usage of multimedia (the integration of text, photos, graphics, animation, sound and full motion video) creates a dynamic communication environment for learners. CBT, however, does not replace the instructor. Rather, the instructor becomes more effective since the learner will have more time to devote to supervision and counseling (Helal, Hesham).

CBT Structure Methodologies (Models)

Helal, Hesham suggested five CBT structure methodologies which are as follows;

i. Tutorials,
ii. Drills,
iii. Simulation,
iv. Games, and
v. Assessment

Tutorials: Tutorials aim to deliver information, skills and guidelines through the initial use of information and skills (Alessi & Trollip, 1991).

Drills: The computerized drill is a methodology used primarily for trainee practices for retention and fluency of the training process.

Simulation: As the trainee becomes increasingly competent in dealing with the simple case the simulation then adds details to bring the trainee close to the reality.

Notes

Games: Games are similar to simulation, to a great extent, as both provide an environment that facilitates training and the acquisition of skills.

Assessment: Assessment is used for many purposes, including the determination of a learner's knowledge (what he/she knows, and what he/she does not), and ranks learners in order in terms of performance, language level and others. CBT is used for assessing individual performance against the agreed competency standard (the outcomes required in the workplace) in many countries.

CBT in Distance Education

The rapid development of computer networks, dramatic improvements in the processing power of the personal computer, striking advances in magnetic storage technology, and the developments in communications technology has encouraged educators to benefit from using the computer in distance learning. The environment of distance education has continued to evolve with advancing technology to where knowledge and instructions are delivered by using a combination of live, two–way interactive audio, video or both and synchronous/asynchronous computer–based interaction. Moreover, the use of Local Area Networks (LANs), the Internet, Wide Area Networks (WANs) and the World Wide Web (WWW) extend the opportunities of learning to new students to make learning more efficient and flexible, and to enrich the learning processes. Furthermore, distance learning enables students/trainees to receive personalized learning and training material via their computer terminal, and where appropriate the software could contain existing video streaming and simulation training. The program may also have the capacity to simulate the facilities available to an actual college or university.

On the other hand, the Internet is developing as a repository for good quality information that can be used for undergraduate and post-graduate level study, and the Internet thus is becoming a good alternative to the campus library in some ways.

Advantages of Computer Based Training

i. The course can be undertaken at their own pace so other students have no effect on personal progress.
ii. Computer based training can make excellent use of multimedia to make it more interesting. e.g. video clips.
iii. Student may be able to use activities such as interactive quizzes or games to practice.
iv. May make use of pre-assessment in order to receive a tailored course.
v. Personal targets may be set to help with motivation and get a sense of progression.

vi. An interactive course may include feedback and assistance from a real tutor, depending on the type of course being undertaken
vii. Distance-learning computer courses offer access for students too far away to attend traditional learning venues.
viii. Course can be undertaken at a convenient time perhaps in the evening or a gap in the day.
ix. Progress through the course may be tracked, allowing the student to pick up from where they left off.

Disadvantages of Computer Based Training

i. Course may too simple or too advanced for their current level of knowledge.
ii. Keeping up the momentum and motivation may be difficult.
iii. Very little interaction with other students, although some courses provide a social / forum area for members.
iv. Training is mainly audio-visual with very little physical practice. Although there are 'follow-along-with-me' kind of training such as a cooking video.
v. Critical dates may be missed due to lack of pressure to complete the course and yet some courses may be compulsory e.g. health and safety training or what to do in the event of a fire.
vi. May skip-read the course just to complete it, so depth of learning may be limited.
vii. Course may be boring due to the lack of interaction with other people.
viii. Some things need to be learnt by doing e.g. swimming, driving. Computer based training can only be a supportive measure in this instance e.g. tips for better technique.

COMPUTER MANAGED LEARNING (CML)

ACTIVITY

Identify the ways and means for the implementation of CBT in your Institution.

Discuss with your administrator about various constrains of application of CBT and suggest them solution to overcome the problem.

CML is a system in which a computer is used to manage several aspects of instruction, including learning assessment through administration of pretests and posttests; design and preparation of learning prescriptions; and calculation, analysis, and storage of student scores.

Notes

CML implies the role of computer in education as management-aids. Since computers have been used mainly in commercial applications, educational institutions also started using computers for management functions, CML systems are usually conceptualized and implemented as aids to the teachers in their task of controlling and managing the content, pace, sequences and method of learning by the students. As with many computer applications, the data recorded in CML for one purpose can also be used for other purposes. Records of students' performance can be used as a base for career and further-educational counselling; and can be summarized into reports from one school to governmental bodies on subjects studied, pass rates, etc.

Thus, Computer-managed instruction is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, and assessment of learner performance. Computer-managed instruction (CMI) aids the instructor in instructional management without actually doing the teaching.

Jasmine(2011), noted that unlike CAI, where in computer is used in tutorial work, CML makes use of the computer in a different role in instruction. In CML the main role of the computer is record-keeping and it does not provide any direct instruction to the learner. It takes over the other responsibilities of the teacher like evaluating the response sheets of students, gathering and sharing information about each learner and updating the same periodically, finding the resource options available for every individual student to learn a topic, monitoring the learning of the student while he is making use of the instructional programme selected to suit his potentials and directing the learners what to do next (i.e. Evaluation, Record-keeping, Retrieval of reports, Find resource options, Prescribe and Control lessons). This type of instruction, though indirect, helps to assess the learner's present level of knowledge, weakness or gaps in his learning and remedial action possible.

Robby Weatherley (1987), et al., emphasized that Computer Managed Learning is a technology that manages and assesses the learning process. The computer system provides an administrative framework through which the learner interacts for such tasks as enrolment, unit or module selection, direction to or provision of study material, assessment and feedback. In its simplest form it is a computerised question bank. It is important to note that Computer Managed Learning (CML) is different from Computer Aided Learning (CAL). CML is not in itself a form of instructional delivery it is not about teaching the students as is Computer Aided Learning. Nevertheless, there is a high degree of interaction between the learner and the computer the underlying rationale is to create an efficient and effective learning environment where the learner takes control of and is responsible for her or his own learning.

Notes

A Computer Managed Learning system can: produce learning guides map the learning path for individual students direct students through learning tasks and to different reso provide individualised feedback link questions to modules and learning outcomes as well as assessment criteria randomly select questions from a bank depending on specified classification /difficulty levels produce challenge tests produce practical assessment tasks allow for batch /group assessment report on student progress as individuals or groups provide course reports provide statistical reports.

CML can also: control progress of learners be networked allow for remote access provide security for question banks and student results provide email facilities. arces for the learner with the content for the teacher Computer Managed Learning.

Comparison of CMI with Conventional Instruction

As compared to conventional classroom instruction, the computer Managed Instruction (CMI) developed by Daniel Davies appears to have many superior features (Jasmine,2011).

In conventional instruction, the teacher must make the decision instead of the computer. He must decide what to teach (objectives) to whom (entering behaviour) and how (procedures). And he must determine the extent of the student's success (performance assessment). All decisions are interrelated and interdependent. The teacher must be very careful when he makes decisions in his pre-tutorial phase. Very often the teacher has only one programme available for students of widely varying entering behaviour in conventional instruction. But the professor function in the computer model has access to a store of knowledge and alternative programmes which the teacher cannot have. Hence Stulurow and Davies believe that only computers have the capacity to make all the decisions and accommodations and enlightened pedagogy requires.

Further, due to self-learning, students attain higher level of proficiency. As student's learning is monitored continuously, requisite changes are incorporated in the instructional programme then and there so as to make it more effective.

Advantages of CML

i) Can provide 24 hour per day access
ii) Frees teachers and trainers from the many administrative tasks associated with teaching.(which means that they have more time for interaction with students)
iii) Can provide immediate results and feedback on assessment tasks.
iv) Provides more effective evaluation of courses and learner paths

v) Facilitates self -paced learning and avoids the 'lock -step' approach where students have to study the same material at the same time.

Disadvantages of CML

Notes

i) Heavy reliance on communications networks that sometimes have difficulty coping with fluctuation in the level of user traffic.
ii) The lack of a human interface between the students and the judgments made, although you can build into a CML system a series of regular interactions with teacher /course advisers /mentors. Arrange for the People to be available and ensure that suitable instructions to access these human resources are included in the student advice in the CML system.
iii) Insufficient access to computer equipment.
iv) Equity and access issues arise for some people who may not be able to access the courses if they do not have appropriate resources.
v) Expensive to implement.
vi) Requires ongoing maintenance to ensure currency of question banks.

9.2.2 COMPUTER ASSISTED INSTRUCTION (CAI)

CAI uses a combination of text, graphics, sound and video in enhancing the learning process. The computer has many purposes in the classroom, and it can be utilized to help a student in all areas of the curriculum.

CAI refers to the use of the computer as a tool to facilitate and improve instruction. CAI programs use tutorials, drill and practice, simulation, and problem solving approaches to present topics, and they test the student's understanding.

Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. CAI uses a combination of text, graphics, sound and video in enhancing the learning process.CAI implies the situation in which the learner generally is engaged in two-way interaction with the computer via terminal.

CAI is the activity where teaching and learning in any part of the curriculum are aided by some application of the computer. The role of the computer can be as a teaching aid, or it can be more student-centered.

Notes

Barker P(1988) has suggested the following **functions of CAI**:

1. Management of learning,
2. Testing,
3. Tutoring,
4. Exercising,
5. Use of a computer as a calculator.
6. Use of a computer as a laboratory.
7. Use of a computer for producing technical materials,
8. Dissemination of material
9. Archival of material
10. Medium of expression.

Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place.

Typical CAI provides

1. text or multimedia content
2. multiple-choice questions
3. problems
4. immediate feedback
5. notes on incorrect responses
6. summarizes students' performance
7. exercises for practice
8. Worksheets and tests.

Advantages of CAI

Following are the advantages of CAI:

- Information is presented in a structured form. It proves useful in the study of a subject where there is hierarchy of facts and rules.
- CAI forces active participation on the part of the student, which contrasts with the more passive role in reading a book or attending a lecture.
- CAI utilizes a reporting system that provides the student with a clear picture of his progress. Thus students can identify the subject areas in which they have improved and in which they need improvement.

Notes

- By enabling students to manipulate concepts directly and explore the results of such manipulation, it reduces the time taken to comprehend difficult concepts.
- It offers a wide range of experiences that are otherwise not available to the student. It works as multimedia providing audio as well as visual inputs. It enables the student to understand concepts clearly with the use of stimulating techniques such as animation, blinking, graphical displays etc.

It can enhance reasoning and decision-making abilities.

Limitations of CAI

- A CAI package may be regarded simply as a novelty, rather than an integral part of the educational process.
- Though simulation permits execution of chemical and
- Biological experiments, hands-on experience is missing. Moreover, CAL packages cannot develop manual skills such as handling an apparatus, working with a machine etc.
- It is expensive in terms of staff time to devise and programme effective CAI.
- Content covered by a certain package may become outdated. A very high cost is involved in the development of these packages. If the course is outdated, the resources involved in its development will be a waste.
- CAI packages may not fulfill expectations of teachers.
- Objectives and methods decided by the CAI author and of a teacher may differ.
- Motivating and training teachers to make use of computers in education is a challenging task. They may have fear of this new device. They may be unwilling to spend extra time for preparation, selection and use of CAI packages. It may also be perceived as a threat to their job.
- There are administrative problems associated with computer installation. The problems particularly related to the physical location of the computer resources, the cost of hardware maintenance and insurance and time- tabling.
- The rapid development of hardware makes it difficult to select a system before it becomes obsolete. If a new system is installed by a maximum number of institutions, they may not get courseware required for the system and courseware developed so far may become useless.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

1. CBT is concerned with -----------, which aims at achieving various skills.
2. Many PC applications now come with some modest form of CBT, often called -----------
3. A high degree of decision making and interaction between the learner and the computer are ensured in -------------.
4. In ------------------ mode the decisions and accommodations and enlightened pedagogy requirements are fulfilled.
5. With CAI students can receive instruction ……….. without being in hurry.
6. Students can get ……………… immediately for his response.
7. . ……. is a self-instructional activity in which the computer is used as a medium.
8. ……….. relates to specific tasks within the real world

True or false

9. CML implies the role of computer in education as management aids.
10. Computer can be used as a teaching machine.
11. Computer cannot be used for dissemination of material
12. If games are provided with instruction students will acquire new concepts and skills.

Notes

9.3 EVALUATION

- What is Compute Based Learning
- Explain Computer Manage Learning
- Describe briefly about the computer assisted learning
- Mention the advantages of CAI?
- What are the limitation of CAI?
- Mention a few problems related to the CAI?

9.4 LET US SUM UP

Computer technology has reached the schools. As a teacher you will be required to use the computer as a teaching learning tool. If a teacher walks parallel to technology and tries to develop software,

technology will be a boon to education. In this unit, we have discussed various modes of Computer Assisted Instruction e.g. Drill and Practice, Tutorial etc.

While developing any software, a teacher should adopt a certain procedure. Advantages of CAI are summarized hereunder;

- one-to-one interaction
- great motivator
- freedom to experiment with different options
- instantaneous response/immediate feedback to the answers elicited
- Self pacing - allow students to proceed at their own pace
- Helps teacher can devote more time to individual students
- Privacy helps the shy and slow learner to learns
- Individual attention
- learn more and more rapidly
- multimedia helps to understand difficult concepts through multi sensory approach
- self directed learning –students can decide when, where, and what to learn

Limitations of CAI are summarized hereunder;

- may feel overwhelmed by the information and resources available
- over use of multimedia may divert the attention from the content
- learning becomes too mechanical
- non availability of good CAI packages
- lack of infrastructure.

9.5 UNIT-END ACTIVITY

i. Bring out a ‘School Magazine’ using computers,
ii. Prepare a Module to teach a difficult unit in your core subject.

9.6 POINT FOR DISCUSSION

Discuss the possibility of including learners while developing courseware in each subject area.

9.7 ANSWERS TO CHECK YOUR PROGRESS

Notes

1. Training	7. CAL
2. Tutorial	8. Training
3. CML	9. True
4. CML	10. True
5. At his own pace	11. False
6. Feedback	12. True

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Notes

UNIT–X APPLICATION TO COMPUTER PROGRAMMES - II

STRUCTURE

10.1 INTRODUCTION

Computer Assisted Instruction, abbreviated as CAI, is a term that refers to interactive instructional strategies that use computers to convey and teach instructional material to students, as well as monitor their learning. Whereas, Computer Assisted learning, abbreviated as CAL is concerned with the effective utilization of computers in the learning process in accordance with the individual differences where students can learn at their own pace. CAL can test attainment at any point, provide faster or slower routes through the material for people of different aptitudes, and can maintain a progress record for the instructor**.** In this unit we will discuss about the concept of Computer Assisted learning, different modes, steps involved in the development of CAI and finally advantages and limitations of CAI.

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10.2 OBJECTIVES

After going through this unit, you will be able to explain the learning styles

- Explain the CAL
- Describe the steps involved in the development of CAL
- Realize the Advantages of CAL
- Understand the modes of CAL

10.3 COMPUTER ASSISTED LEARNING (CAL)

Computer basically has three basic units namely input, CPU and output units. It has been reported that the first electronics computer was developed in 1946 at the University of Pennsylvania. Computer assisted Learning or briefly known as CAL is an interesting innovation in educational technology. It marvels have been demonstrated and seem to revolutionize the whole spectrum of education. It has better flexibility and more versatility than any of the teaching machine. It can cater to the individual needs of many students at a time and record all the responses of all the pupils with reliability. The time taken by individual student in responding to a question and extent of correctness in the same are also recorded by the computer. All this helps the educators in planning instruct and providing relevant materials.

The CAL can deal the problems of quality in education more effectively any more flexible kind of branching is possible on the part of the computer according to the student's performance. A learner can make progress at one's pace receive and choose the material sequencing and level of instruction freely. Since each learners performance is automatically recorded and can be evaluated and education be provided according to the strategy that is best suited to the individual. The teacher can be relieved from the daily routine and monotonous drilling activities. It has been experimentally proved that any lesson in any subject can be programmed for CAL if the objective is clearly defined and learning materials are represented in words visuals and experiments.

The CAL installation usually consists of individual learning booths each with a console. Every student sits in front of the console with a monitor displaying information etc. A complete learning package suiting to his individual needs is presented sequentially. This package may consists of video as well as audio tape recordings film slides, film strips and so on. The student may make queries to the computer by means of a type writer key board and get answers in printed forms. The student may write the answers directly on the cathode ray tube display screen with a light pen which can be evaluated

by the computer. On completing of a programme the computer records his progress and prints out a report for the teacher.

9.1 MODES OF CAL

Notes

The scope of CAL covers a wide variety of functions. These functions are usually realised in terms of a limited number of CAL modes. The major modes of CAL can be noted as follows:

1. Drill and Practice
2. Tutorial
3. Dialogue /Conversational
4. Games
5. Simulation
6. Databases
7. Narrative/Presentational

Drill and Practice

Drill and Practice is the simplest form of CAL. A series of exercises are given to a student by the computer. The student gives a response. The response is processed by the computer and accordingly new activity is designed. Exercises can be created by the computer by avoiding repetition. The items can be selected at random from the list and presented. Sometimes the series is presented as it is. Also endless exercises can be provided. As a response to the exercise, the programme either asks the student to try again till it is right or provides a chance or just states the right answer. The responses are also analysed to mark the success or to assert the need of more study. The questions in the drill and practice are of these types: fill in the blanks, which is the odd man out, correct or wrong, answer in a word/ sentence, multiple choice. Activities like drawing, measuring and arranging objects are also possible on computer. Generally, typing of long answers is avoided in CAL.

Tutorial

In tutorial the titles to be studied are divided into a sequence of short sections called frames. It bears a close resemblance to the programmed learning sequences found in print and in teaching machines in 1960's. The programmed text presents a number of problems, particularly in determining whether the student has really mastered the current step and in deciding how to branch to the next step. The computer can be used to determine students' needs and preferences and to decide how to branch through material. The material can be more complex without adding to the students' burden. Thus in

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the field of branching, the computer opens up a range of possible branching which would have been difficult to arrange in the scrambled text or primitive teaching machine. The computer can be programmed to branch any number of alternative pages in text where there are many different routes. In tutorial, each learner can be diagnosed at every small stage and be led to a new path according to his/her need.

Conversation or Dialogue

These are based on the teaching learning method used by 'Socrates'. Both the teacher and the learner take an initiative to start the teaching learning process. They can ask each other questions and answer them. These types of tutorials are based upon models of teaching-learning process and require very complicated and time-consuming programming. Hence, writing most of these systems are research laboratory work and they are not widely used. Also these are not practically cost-effective instruction systems.

In dialogue tutorials the computer is involved in learning about the learner. Thus they try to improve and further individualize the instructional strategy being used. Deep questioning techniques and multifaceted analyses of the responses given by the student can help in building complex interactive dialogues.

Games

The modes brought to limelight earlier provide information in a structured way, according to rules specified by the author. Gaming involved with a dimension of competition motivates learners to approach the given situation with enthusiasm. If learning concepts are taught or given for practice through games, learners generally tend to stick to it regardless of the time it consumes. Video games as well as computer games, without any educational input, are very popular with children who have access to a computer. If they are provided with instructional games, they will certainly acquire new concepts and skills.

Simulation

A few real life systems and phenomena cannot be directly learnt. The experiments may be time-consuming, expensive, difficult or sometimes dangerous too (e.g. fission of atom).

Computer can be used to simulate a real life system by following a set of rules, which approximate the behaviour of the real system. The rules specified for simulation may be simple or complex and quality of approximation can be governed. Various levels of approximation can be provided in the same simulation courseware. It allows effects of increasing experimental error or to give a feeling for the accuracy of the simulation. Simulation offers flexibility and control. In simulation, the particular feature of the computer as an ultra rapid calculating and data processing machine is used to its best advantage.

Simulation can provide the following advantages:

a. It avoids the difficulties and complexities of real by using idealized conditions, e.g. changing demands and supplies of commodities to see its effect on the market economy.

b. It overcomes the prohibitive costs of laboratory or field-work based experiments, e.g. providing variety of acids with different densities in a lab for one single experiment.

c. The time normally demanded by an experiment can be foreshortened.

d. Dangerous experiments can be experienced in safety, e.g. increasing proportion of pollutants in the environment to see the consequences.

e. Experiment, which would normally be impractical, can be attempted, e.g. creation of civilisation on a different planet.

f. The level of complexity can be increased slowly. Variables can be added at every stage.

Databases

One of the modes of learning is learning through exploration of resource material and library utilisation. The power of a computer to store, retrieve and process information is used to help the student as s/he browses through the material. One can respond to the questions about the related information and retrieve an item which one needed, summarise statistical data, suggest possible times of investigation that may be of interest.

As in the library a book or a resource material can be found using subject code, author index or title index. One can provide such key works to the computer to find resource material. Unlike books, material stored in a main-frame computer can be made available at all the terminals at a time.

Narrative/Presentational

Under this context the computer screen is used to present material to the student in a form some-times referred to as an electronic blackboard. Along with normal verbal approach, movement and animation can be used with colours and music. Simple presentations can easily be developed by teachers to introduce learners to a new information, e.g. a teacher can develop slide shows using MS-Power Point or even develop web-pages using Front-Page.

Notes

10.3 ADVANTAGES OF CAL

The learning process could be fortified more in many ways through these modes. Advantages of the CAL approach are mentioned below:

1. CAL is individualized, that is each student is free to work at his own, totally unaffected by the performance of any other students. Since it can provide a method of instruction designed for self-directive study, it helps in improving skills or achieving objectives at all difficulty levels.
2. Information is presented in a structured form. It proves useful in the study of a subject where there is hierarchy of facts and rules.
3. CAL forces active participation on the part of the student, which contrasts with the more passive role in reading a book or attending a lecture.
4. Partly as a result of interactive student participation, it provides immediate feedback.
5. The feedback may be remedial in nature or it may direct the student to a certain path depending on its response.
6. CAL utilises a reporting system that provides the student with a clear picture of his progress. Thus students can identify the subject areas in which they have improved and in which they need to improve.
7. By enabling students to manipulate concepts directly; and explore the results of such manipulation, it reduces the time taken to comprehend difficult concepts.
8. CAL also saves the unauthentic labour of teachers as well as students. Teachers need not waste their time and labour in arranging same instructional experiences, forming questions for every student, evaluating them at every learning stage, as all these are carried out by the computer programme.
9. CAL offers a wide range of experiences that are otherwise not available to the student. It works as multimedia providing audio as well as visual inputs. It enables the student to understand concepts clearly with the use of stimulating techniques such as animation, blinking, graphical displays, etc.
10. Where a conventional practical demonstration is extremely difficult, impossible or dangerous, where the apparatus is not readily available, when a real situation would take an impossibly long time to investigate or where manipulation of different variables may prove useful, simulation is of tremendous significance.

11. Learners can be provided any number of options in multiple-choice questions. Also a series of responses may be provided where some are better than others, with each response providing feedback on each of the options.
12. CAL provides a lot of drilling which can prove useful for low aptitude students and through which high-altitude students can be escaped.
13. CAL can enhance reasoning and decision-making abilities.
14. Students who use CAL become increasingly self-directed in their learning style. They become more responsible for learning and less dependent on teachers.' They consider themselves capable learners.

10.4 LIMITATIONS OF CAL

Though CAL has a number of advantages, it engenders same limitations also. Some of these are as follows:

1. A CAL package may be regarded simply as a novelty, rather than an integral part of the educational process. It may threaten the objectives of the package.
2. Though simulation permits execution of chemical and biological experiments, hands-on experience is missing. Moreover, CAL packages cannot develop manual skills such as handling an apparatus, working with a machine, etc.
3. There are real costs associated with the development of CAL systems. It is expensive in terms of staff time to devise and programme effective CAL.
4. Content covered by a certain CAL package may become outdated. A very high cost is involved in the development of these packages. If the course is outdated, the resources involved in its development will be a waste.

> ACTIVITY
> How do you introduce CAL in your institution?

10.5 PROBLEMS RELATED TO THE USE OF CAL APPROACH

There are a few problems associated with the use of CAL

Notes

1. Motivating and training teachers to make use of computers in education is a challenging task. They may have fear of this new device. They may be unwilling to spend extra time for preparation, selection and use of CAL packages. It may also be perceived as a threat to their job.

2. CAL packages may not fulfill expectations of teachers. Objectives and methods decided by the CAL author and of a teacher may differ.

3. There are administrative problems associated with computer installation. The problems particularly related to the physical location of the computer resources, the cost of hardware maintenance and insurance and time -tabling.

4. Quality courseware demands a team approach. Expertise required for developmental process is from different fields such as teaching, programming, hardware engineering, subject expertise, etc. They may face problems in coming together for a long time.

5. The rapid development of hardware makes it difficult to select a system before it becomes obsolete. If a new system is installed by a maximum number of institutions, they may not get courseware required for the system and courseware developed so far may become useless.

To surmount many of the problems related to CAL a lot of educational software has to be developed. A number of such software is being prepared by experts in various fields. For their wider use, they should be validated.

Check Your Progress

Notes: a) Write your answer in the space given below:

b) Compare your answer with the one given at the end of the unit.

Application to computer Programmes

1. A computer has .... basic components.

   a) 7 b) 6 c) 3

2. The first electronics computer was developed in 1946 at the university of........

   a) Cambridge b) Oxford c. Pennsylvable

3. With CAI students can receive instruction ……….. without being in hurry.

4. Students can get ……………… immediately for his response.

Notes

10.6 STEPS INVOLVED IN DEVELOPMENT OF CAL PACKAGE

The sequence of the steps involved in the development of instructional materials may change according to the nature of the problem. The general steps involved in the development of software can be discussed as below:

Analysis Phase Selection of a unit

Though computer is one of the most effective media, it demands more money resource than any other media. The computer therefore should be used creatively and judiciously. Assuming that a teacher has decided to write a programme for CAL, the first question that she should bear in mind is: why use a computer (CAL) approach. There should be a rationale for the use of a computer.

Before you start to develop a CAL package consider the following questions:

- Is my learner going to gain something more than s/he will gain by using other media/innovative methods? Does my topic involve such objectives which can be achieved fully only if I use CAL?
- Will my package provide individual learning experience to the learner ?
- Will the package provide interactivity with the learner, user control and scope for self-evaluation?

Content analysis

To develop any self-learning programme, we need to analyse the content properly. The teacher should know each and every teaching point from the selected topic. The process of dividing the topic into sub-topics or sub-points is called Content Analysis. Content analysis helps the teacher in identifying all the concepts, definitions, information points, rules, examples, formulae, diagrams, illustrative graphics, etc. related to the content.

Entry behaviour

Along with the content analysis, analysis of the target group is very essential. Before developing any educational software, vocabulary, learning style, needs, conceptual level, comprehension level of the learners should be analysed.

Once the content and target group are analysed, a teacher can sequence the concepts so that they are logically arranged. Here the teacher can identify the prerequisite to learn the topic. If some basic

concepts are not clear to the learner, s/he will not be able to use the learning material of your topic. Hence the specifications of the learner's entry behaviour are to be finalised.

Specification of objectives

After selecting a suitable topic, and analysing it, the instructional objectives can be determined keeping in mind the earlier learnt capabilities of the learner group both in terms of their previous knowledge and other competencies. Preparing statements of learning objectives for a programme is like preparing a summary of the learning process in terms of the competencies to be learnt.

a. It helps the teacher to select the appropriate learning package for the learners.

Development of evaluation measures

A statement of objectives describes the capability to be developed. If this description is clear, it helps us to design a test to assess how well the learner has acquired that capability. A well written objective immediately suggests relevant post-test items.

Self-learning material also demands a pre-test to decide whether there is a need on the part of a learner to go through the material or a sub-unit or whether he can skip it. So far we have experienced that the teacher decides what s/he wants her/his students to learn irrespective of what they all know or wish to know. Self-learning material provides facility to each individual learner to check what s/he knows and what s/he can learn.

Design Phase

The analysis phase is then followed by a creative phase, that is the design phase. Development of modular structure. Since CAL is a self-instructional approach, individual differences should be taken into account. Large-scale learning processes are more easily handled in a segmented or modular format. In this approach clearly defined areas of activity may be learnt only by those learners for whom they are suitable. Thus, a particular learner will concentrate only on a particular sub-topic which he wants to master. In developing a modular structure, the course designer should identify the title of each module, objectives and the combination of presentation methods most suitable. Thus, the whole package would be a set of various interrelated modules. Though they are interrelated, one can select modules to be learnt or the pre-test may help the learner in selecting appropriate modules.

Development of flowchart

The flowchart is an important piece of documentation necessary when developing courseware. Once all the information that is required to be included in the course has been identified, and the rule set has

been constructed, the flow- chart becomes the link between this information and the screen-presentation.

"A flow-chart is a chart showing the flow - the relationships between events, activities, concepts. The relationship may be temporal (in time order) or non-temporal but there is always a certain sequential order," (KuikarnLS.S. 1986).

In contrast to study texts and structured texts, which follow one major route through a course, CAL enables appropriate feedback to be given to the learners in response to their answers. These anticipated wrong answers could lead to remedial loops containing material, which is designed to clear up serious misunderstandings. To avoid confusions in the branching, the programme flowchart is necessary.

The flowchart reveals the quickest route through the course. It shows the frame numbers and the count loops. It helps prevent the course getting muddled and clearly shows the branching. The flowchart can be used by later authors to amend or edit the course. It is also important in validations that are checking back to what the author wanted to happen.

Designing frames

One of the advantages of CAL is that information can be broken down into quite small packages. A module consists of a series of frames. Some of these will be criterion frames, teaching frames and some testing frames.

Criterion frames

These should be written first before the teaching frames, also acting as a check that the teaching frames achieve their objectives. It should be noted that a criterion frame tests a teaching point and no reference material is used in the frame. This is a test of the learner's knowledge. Therefore, a criterion frame on the flowchart should be clear of loops guiding the student to get correct answers to questions raised in frame.

Teaching frames

Teaching frames contain all the information needed to complete the course. Testing frames, teaching frames are also associated with questioning frames, since there are few better ways of learning information than by using it. Testing frames can have help and hint frames with them. These can be in the form of a prompt or a clue. Anticipated wrong answers must be handled properly in the answer analysis, which requires a lot of imagination on the-part of designer.

Notes

Once the frames are designed, they should be converted in a manner useful for screen display. Therefore, screen layout forms are designed at this stage.

Preparing screens with reference to actual programming

At the programming stage, the roles, which the computer can play, should be appreciated. A number of characteristics of computer display are discussed by field experts and also some guidelines for their effective use are defined. Some important points are discussed in the following paragraphs. They are discussed under the following headings:

a. Screen layouts,
b. Text,
c. Graphics,
d. Timing,
e. Animation,
f. Sound,
g. User control.
h. Screen layouts

This refers to what is displayed on the screen of the terminal. A few simple rules for good design are stated by Woodhouse David and Mc Dougal Anne (1986).

They are as follows:

1. be consistent from one screen to the next;
2. arrange statements in the same order as actions to be carried out;
3. avoid excessive abbreviation:
4. use spacing generously and wisely;
5. allow adjustment of the level of helpful prompting information to the level wanted by the operator;
6. do not clutter the screen with too much information, or too great a variety of symbols, colour or scripts or inverse colour blocks;
7. do not overuse the facility for blinking as it may reduce concentration. If a blink is used, it should be at the rate of 3-5 per second.

In general,- the minimum amount of information necessary to achieve the purpose should be displayed. A small amount of graphical or textual information clearly and effectively presented is more likely to enhance e understanding.

Information to be dissipated should be presented one key point at a time. An effective way of doing this is to reveal new' images on the

screen or to change all or part of an existing display. But care should be taken while changing part of an existing display so that the change is noted by the learner. The change should be eye-catching. Two or more changes at a time are not advisable. For example, if a new text and graphical movement are displayed at the same time, the graphical movement obviously distracts the attention and the new text is not attended to use of pauses between two actions is helpful in such cases.

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It is appreciable and sensible to place titles at the top of the screen and prompts for action should appear at the bottom after the screen has been assimilated.

The technique of blinking can be used to catch the learner's eye towards an important concept.

HINT

The designer may opt to retain some text or a diagram while displaying additional information. The use of windows to display information in a box that overlays part of the existing screen can be very effective to emphasize points, for help, information etc. Windowing may also be effective for error message.

Constant change can make the activity more interesting, avoiding visual ennui and retaining attentiveness. Alternatively, visual consistency might be more important to keep users confident and comfortable with the conventions adopted, that is where to look for new information, how to answer questions, etc. Buttons like 'HELP', 'QUIT', 'TEST', 'MAIN MENU', should be the same throughout the package.

The rule "The programme should say just what is required and no more" stated by Marshall David (1988) is an important point of consideration. Visual display units are not suited to large amount of text. Text should only appear when essential. In general, text should be summarised. Paragraphs should be no more than three lines in extent and should have space between them. If possible, form a meaningful group of words to make the perception of the content easier.

The screen format should always adopt the conventions that lines do not end in the middle of words, and that paragraphs should not start on the last line of a page display. Text should be distributed over the whole screen or centered. Characters in lower case are assimilated more quickly than just upper case, which may be reserved for headings and other emphasis. Text should be grammatically consistent.

Notes

Graphics and Colours

The graphics capabilities of screens can be used in two ways. Graphics can be used to display pictures and diagrams. They can also be used to enhance a text display by drawing boxes and borders, shading etc. The use of boxes, borders, shading etc. is important in enhancing screen presentations.

By making display more attractive, colour helps motivate learners. The range of colours available is very restricted. Therefore, items in different colours starid out and the eye try to give significance to the colour chosen. This can be distracting but it can be used to focus attention.

Elements of a display, which appear in the same colour, give the impression of being related in some way. Conversely, elements in different coloursare seen as separate. This coding can be used deliberately to relate different parts of a display, e.g. Good and bad habits of a child can be shown in two different colours throughout the package.

It is advisable to be consistent with the use of colour throughout a piece of software. For example, heading should be in the same colours unless there is a special reason for a change.

Blocks of colour behind part of a display can be used for emphasis. Attractive informative displays can be created using just one background and one foreground colour. Not all colour of combinations of foreground and background colours give legible displays. It is essential to select colours, which contrast in brightness. Placement of blocks of colour of similar brightness next to each other should be avoided (e.g. red and blue). They tend to merge and look fuzzy. Also large solid blocks of white and yellow should be avoided since they give an irritating flicker. Too much contrast or very bright colours should be avoided. Dull colours make learners disinterested.

d) Timing

Alteration to the display resulting from a learner's input should be clearly visible. They should be completed at a speed. \vh ich neither keeps the learner waiting nor is too fast for the learner to see what has changed. Allowing the user to control when changes to the screen if display takes place, and at what speed, makes a programmemore flexible for use with a wide range of learners of different abilities.

e) Animation

The illusion of movement is a potent feature that can focus attention dynamically. It can visualize processes of change that the programme is illustrating. Too many and speedy animations may create confusion.

Keeping objects animating without reason, along with other important matter on the screen should be avoided. There should be a provision to stop animation by the user. Allowing the user to control animations may increase learner- participation and interactivity of the media to a great extent.

f) Sound

Nowadays, sound effects are being used in good number of programmes. These sounds are either whizzes or bangs or tones to reflect success or failure, or sometimes even appropriate ditties or comments that relate to the content. Buzzers used to reflect failure are proved effective in decreasing the chances of failure.

Use of sounds has led to the development of CAL packages in phonetics and also for developing listening as well as reading skills.

The learner should exercise control over the use and volume of sound.

Sounds may distract the learner from the important message. Hence it is advisable not to use sounds where they are not essential. Verbal repetition of text written on the screen should be avoided.

To conclude, all sorts of documentation and ideas should be ready before the programming phase. At this stage, the task of preparing the module is complete.

g) User control

Interactivity is the keyword in learner-centred activities. If a learner is in the interactive situation, where a learner can experience and get feedback at every stage, learning becomes more effective and long-lasting. The computer can provide this facility which is missing in any other media. A learner should have control over the parameters like sound, animation as well as the content variables. Learners should be able to decide which modules to learn, to open again if needed and close if tired.

Programming Phase

Once the screen layout is ready, the next stage is to get the CAL running on the computer. This can be done in two ways. The instructional designer that is the courseware author, may himself or herself perform the programming task on his own by utilising his/her programming expertise: or the whole task of programming can be performed by another programmer or a team of programmers.

Generally, a teacher who does the instructional design of the CAL package may not possess programming expertise. Such a teacher

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is provided programming facility by special tools. These tools are called authoring tools.

These are the tools that are designed to minimize the actual amount of programming expertise required by a teacher in the creating of educational software.

Authoring systems are software packages that guide the author through the process eliminating the need to know how to programme. From the point of view of end-user, authoring systems provide more facilities than authoring languages and support most of the aspects of the CAL package producing process.

Dean Christopher and Whitlock Quentin (1988) state that some fundamental features must be provided by any authoring system:

- present text and questions on a screen;
- accept responses entered using a keyboard;
- analyse the responses;
- store details of responses and values of counters on a file;
- branch to other parts of the learning programme;
- provide feedback;
- interface with sub routes written in computer programming languages;

The authoring systems do make the computer friendlier. It leads the author through the authoring process one at a time with all control function being executed automatically by the system.

Validation Phase Evaluation by experts

When an author has completed a section of the course, it is available for peer evaluation, the reviewing and assessing of a course. Since CAL involves higher technology and a high cost, if quality ought to be approved by applying some criteria. Once the CAL package is ready for usage, it is expected to be used by a wide range of learners. That is the reason why it requires testing.

According to Dean Christopher and Whitlock Quentin (1988), the following factors should be considered while evaluating a package:

1. Content: The course must teach the subject matter that has been specified in the initial objectives.
2. Accuracy: The internal assessment verifies that the subject matter taught is accurate and sufficient.
3. Presentation: The quality of the presentation on the screen must be consistently high. The usage of the area must be effective and uncluttered.
4. Adherence to presentation standards and guidelines: The purpose of presentation standards is to make the medium as

unobtrusive and sympathetic to the user as possible. The author should not be permitted to use different screen layouts according to whim. Peer evaluation should pick up occasions where the standards have not been adhered to. This will cover such items as:

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a) Yes/No responses;

b) Multiple choice questions;

c) Instructions for continuing to next screen;

d) Headings:

e) Highlighting;

f) Use of capital letters, etc.

5. Use of the authoring language: Just as there should be a set of standards and guidelines for course presentation, there must be standards for using the authoring language if the writing and the amendment of the course is to be efficient. These standards cover such items as labeling, branching, response analysis and use of counters.

Statistics: Statistics are kept for two main reasons: to measure student performance and to aid validation of the course. The detailed, statistics of the exact path that each student has taken through the course, and the answer to each question, are important "during the testing phase.

Peer evaluation tends to a course review that decides the changes that should be made and may, if the evaluation has covered an early section of a course, lead to revised objectives or a new approach to subsequent parts of the course. Any revisions as a result of peer evaluation must be completed before the stage of course validation.

Testing

Validation should only be carried out on courses or sections where the programming part is complete. The course author can hope to get the following data when the sample has completed the course:

1. pre-test and post-test results;
2. the time spent by each student on the computer and on the overall course;
3. the responses of all the students:
4. the students' evaluation of the course;
5. any difficulties the students may have faced.

The subjective information needed by the author is:

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1. suitability of the language used
2. subject matter:
3. questions:
4. presentations;
5. enjoyment.

The process of testing includes two stages:

a) Working with small group of learners i.e. Pilot Study

b) Experimenting with a sample of learners from target group.

c) Pilot Study

The Programme is tested on a small group of learners (5-10). The process of learning is discussed with them. Detail comparative study is done with reference to the learners' entry behaviour, time taken for learning, their learning habits, attitudes and results of post-tests. Thus, there is a scope for revising the programme before its implementation.

b) Field try-out

The study is performed by the experimental research. The data collected from the learners is analysed by applying statistical measures. This is called validation testing. At this stage, the learners go through the programme without the aid of a programme designer. In validation testing also learners should be requested to give overt responses and comments regarding why, according to them, their responses were considered wrong by the computer. The designer can revise the programme in such situations. Data regarding the performance of individual learners from the validation sample should be recorded in a table. After studying the table tentative hypotheses regarding effectiveness, utility, the feasibility of the CAL package can be tested.

Information of this kind concerning characteristic of the target group of learners which after the performance in the programme would be helpful both in revising or preparing supplementary material and in devising remedial instruction where necessary.

Once the validation is over, there is a temptation and likelihood that the project will be regarded as complete. However, with some courses, revision may be forced by changes to the subject being taught. A regular review should be done to consider the status of the course, its usage, relevance, need for improvement, etc. This follow-up process should lead to detailed refinement of the product.

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

5. ……. is a self-instructional activity in which the computer is used as a medium.
6. …….. relates to specific tasks within the real world.

True or false

7. CML implies the role of computer in education as management aids.
8. Computer can be used as a calculation.
9. Computer cannot be used for dissemination of material
10. If games are provided with instruction students will acquire new concepts and skills

10.7 EVALUATION

- What is Compute Based Learning
- Explain Computer Manage Learning
- Describe briefly about the computer assisted instruction
- Mention the advantages of CAL?
- What are the limitations of CAL?
- Mention a few problems related to the CAL?

10.8 LET US SUM UP

Computer technology has reached the schools. As a teacher you will be required to use the computer as a teaching learning tool. If a teacher walks parallel to technology and tries to develop software, technology will be a boon to education. In this unit, we have discussed various modes of Computer Assisted Learning e.g. Drill and Practice, Tutorial etc.

While developing any software, a teacher should adopt a certain procedure. In this unit we have discussed these steps of developing a CAL package. Advantages of CAI are summarized hereunder;

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- one-to-one interaction
- great motivator
- freedom to experiment with different options
- instantaneous response/immediate feedback to the answers elicited
- Self pacing - allow students to proceed at their own pace
- Helps teacher can devote more time to individual students
- Privacy helps the shy and slow learner to learns
- Individual attention
- learn more and more rapidly
- multimedia helps to understand difficult concepts through multi sensory approach
- Self directed learning –students can decide when, where, and what to learn

Limitations of CAI are summarized hereunder;

- may feel overwhelmed by the information and resources available
- overuse of multimedia may divert the attention from the content
- learning becomes too mechanical
- non availability of good CAI packages
- lack of infrastructure.

10.9 UNIT-END ACTIVITY

iii. Bring out a 'School Magazine' using computers,
iv. Prepare a PLM to teach a difficult unit in your core subject.

10.10 POINT FOR DISCUSSION

Discuss the possibility of uniting PL by the learners in each subject areas group work.

10.11 ANSWERS TO CHECK YOUR PROGRESS

1.	(C)	6.	Training
2.	(C)	7.	True

3.	at his own pace	8.	True
4.	feed book	9.	False
5.	CAL	10.	True

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UNIT XI - EX PERIMENTAL LEARNING STRUCTURE

Notes

11.1 INTRODUCTION

Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing". Experiential learning is distinct from rote or didactic learning, in which the learner plays a comparatively passive role.

Experiential learning can exist without a teacher and relates solely to the meaning-making process of the individual's direct experience. However, though the gaining of knowledge is an inherent process that occurs naturally, a genuine learning experience requires certain elements. According to Kolb, knowledge is continuously gained through both personal and environmental experiences. Kolb states that in order to gain genuine knowledge from an experience, the learner must have four abilities:

The learner must be willing to be actively involved in the experience;

The learner must be able to reflect on the experience;

The learner must possess and use analytical skills to conceptualize the experience; and

The learner must possess decision making and problem solving skills in order to use the new ideas gained from the experience.

11.2 OBJECTIVES

After going through this unit, you will be able to :

- appreciate the value of student-centred experiential learning
- describe the importance of organising learning experiences;
- explain the cases of different kinds of learning experiences;
- understand the principles of learning experiences.
- Create new learning experience in the class room.

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11.3 NATURE OF EXPERIENCE

The concept of experiential learning was first explored by John Dewey and Jean Piaget, among others. It was made popular by education theorist David A. Kolb, who, along with John Fry, developed the 'experiential learning theory,' which is based on the idea that 'learning is a process whereby knowledge is created through transformation of experience'. Experience cannot be limited to sensation. It always comes with meaning. It has within it judgment, thought and connectivity with other experiences. Experience is always and everywhere significant.

Dewey explains the concept of experience by including having and knowing having points to the immediately of contact with the events of life. Knowing to the interpretation of the event. Experience is no simply an event which happens it is an event with meaning Dewey states events are present and operative anyway what concern us is their meaning is an integral part of experience.

11.4 LEARNING FROM EXPERIENCE

Experiential learning is a method of educating through first-hand experience. Skills, knowledge and experience are acquired outside of the traditional academic classroom setting, and may include internships, studies abroad, field trips; field research and service learning projects. David Cohen and Walker (1997) have put forward the propositions about learning from experience. As a teacher you may be interested to study them.

Experience is the foundation of and the stimulus for learning: Learning is based on experience. There may be outside aids to learning such as teachers, learning materials etc., but the learning has to be built on experience. Every experience therefore has a potential for learning. But learning does not take place automatically just because of

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experience one has to get actively engaged it is rightly said that experience has to be arrested examined analyzed considered and negated to shift it to knowledge.

To be alert experience need not be recent. The meaning of a poem which was learnt in class VIII may become apparent in the least year of graduation experience itself need not change the meaning (interpretation) changes. When the teacher arranges some group activities every students is given the same experience but the interpretation of this experience may change from individual to individual and hence learning that takes place by every individual is different.

Learners actively construct their experience: We have learnt earlier that we attach our own meaning to events. While others may try to impose their meaning upon us we ultimately define that experience and nobody outside has access to these sensation and perceptions e.g you may give your students different experiences about the concept democracy (some might even dictate the definition of Democracy to the students) but every student may have different perception about democracy.

The meaning of experience cannot be given. It is subject to interpretation The same experiment might have been done by all the students. They might come out with the same rule that air is not a compound but a mixture of gases. But while coming to this conclusion every student experiences it in her/his own way and constructs and reconstructs her/his own experience.

Learning is a holistic process: The experience is generally classified in three domains i) cognitive (related to thinking) 2. Affective (relative to feelings and emotions) and 3. Psychomotor (related to action and doing). But these are not mutually exclusive compartments. There is high degree of continuity in all our experiences.

Learning is socially and culturally constructed: Learners do not exist independent of their environment. Learning does not occur in isolation from social and cultural norms and values. But critical reflection is required to examine the influenced of our values and culture e.g. the most powerful influence of social and cultural content on learning is that which occurs through language.

Learning influenced by the socio emotional content in which it occurs: Emotions and feelings play a very important role in learning. Acknowledging them can enable us to significantly redirect our attention towards matters which we have been neglecting Denial of feeling is denial of learning.

The way in which we interpret and experience is intimately connected with how we view ourselves developing confidence and

building self esteem both flow learning and experience If we do not respect our perceptions and have confidence in what we see or feel then we cannot make use of information that we collect from the world outside. A belief in our ability to act learns is a prerequisite for learning. Without this we are passive participants in the construction of others.

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11.5 EXPERIENTIAL LEARNING

Experiential learning may be defined as learning through experience or learning by experiencing a phenomenon. There are many ways in which educationist and social scientist study the nature of experiential learning.

The experiential learning has following factors;

Learning by doing: Here the hands on experiences direct experience is given importance In John Dewey's words An experience a very humble experience is capable of generating and carrying any amount of theory (or intellectual content) but a theory apart from experience cannot be definely grasped even as a theory.

Many examples such as laboratory work, sports training, planting trees, etc can be cited. The laboratory work for example emphasizes education as a direct active experimental activity.

Personal learning through everyday experience: Learning involves becoming aware of qualities, patterns consequences of one's own experiences as one experiences it.

Experiential social group processes: Learning from experience has been extended to learning social skills. The techniques for such experiential learning are used in areas such as management training, personal growth, etc.

Experiential learning in classroom: The group process movement has enriched classroom learning with host of new interpersonal activities. Role plays, games and simulations, value exercises etc engage learners in concrete experiences which when processed lead to cognitive as well as attitudinal and behavioural changes.

Other activities include the use of audio-visual aids/materials, art, drama music, dance, and play. Most important in using these methods is the provision of adequate time for reflection and conceptualization.

The concept of experiential learning drives us to view learning from a holistic view. Kolb has developed a model, which depicts learning as a four stage cycle with each stage requiring different abilities and skills on the part of the learners.

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Edgar Dale has classified Experience into Direct, Indirect or Vicarious and Abstract. The following figure shows Dale's cone of Experience.

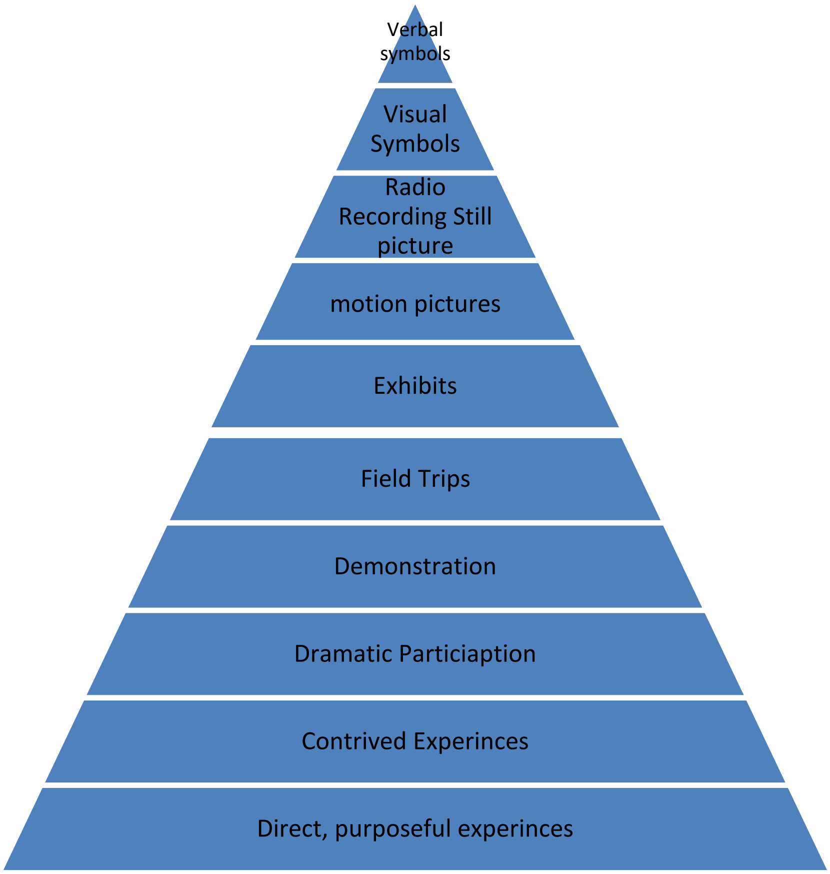


Fig No.11.1 Dale's Core of Experience

11.6 OBJECTIVES OF EXPERIENTIAL LEARNING

There are a number of educational truisms related to the rationale for experiential education, for example "Give a person a fish and they can have a meal, teach the person to catch fish and they can eat fish for a lifetime." There are also sayings attributed to various cultures related to experiential learning such as:

I hear, and I forget

I see, and I remember

I do, and I understand.

—Ancient Chinese proverb

The rationale for the use of experiential education comes down to the purpose/objectives for the teaching/learning experience.

It has been mentioned that the experience is generally classified into three domains. There is a high degree of continuity in all experiences. Considering this holistic nature of experience a hierarchy of objectives for experiential learning is suggested by Steinke and Bell which is yet to be tested. The objectives suggested are as follows.

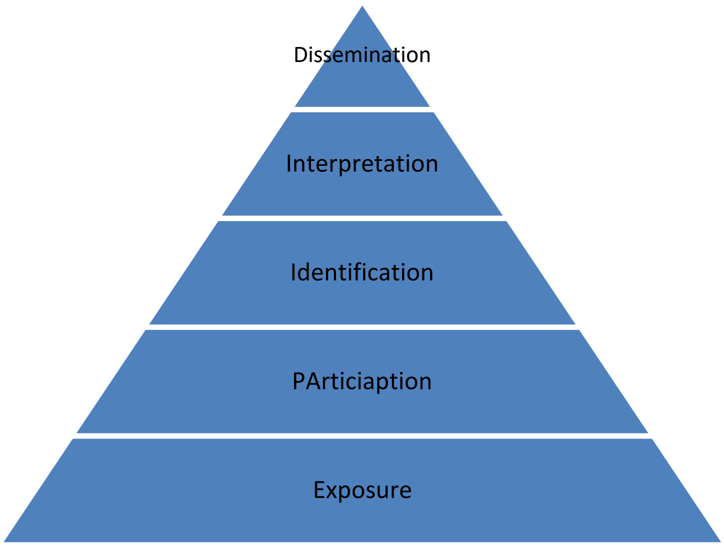


Fig No.11.2 Taxonomy of Objectives for Experiential learning

Check Your Progress

Notes : a) Write your answers in the space given below.
b) Compare your answers with those given at the end of the unit.

Fill in the blanks

1. Experimental learning environment should leave ample scope for individuals to …………… what they understand with teacher and peers
2. Making conversation with pupils should be …………

Say True of False

3. Learning culture can be created only by teachers
4. Using available resources creatively is possible with graphics
5. Experience is the ……………….and stimulus for learning
   a. Foundation b. diving force c. good
6. Learning is a ………………….process
   a. complex b. atomic c. holistic e. all the above

11.7 EXPERIENCES LEADING TO LEARNING

Notes

In order to realize the above mentioned objectives the learners has to go through certain experiences these may be called as expected learner behavior these are presented in table No.8.1

Table 8.1 Experiences leading to learning				
Exposure	Seeing Touching	Observing Noticing	Smelling Reacting	Tasting Recognising
Participation	Observing Visualising Manipulating Defining	Discussing Directing Ordering Listening	Exploring Reading Collecting	Assessing Estimating Modelling
Identification	Associating Experimenting Interpreting Hypothesising Observing for information	Classifying Mapping Investigating Charting	Categorising Estimating Writing Reading	Explaining Applying Drawing
Internalisation	Analysing (deducting, inferring) Generalising Transferring	Comparing or contrasting in depth probing	Summarizing	Inquiring
Dissemination	Communicating	Demonstrating	Presenting	Motivating

11.8 TEACHING STRATEGIES FOR EXPERIENTIAL LEARNING

Experiential learning strategies emphasize the role of hands-on, personal experience in constructing knowledge. In Lewin's model of experiential learning the process begins with having personal, concrete experiences. From these experiences, individuals make observations and reflect on those observations. Next, the individual constructs abstract concepts and generalizations based on their observations and interpretations. These concepts and generalizations can then be tested in novel situations. Experiential learning methods are particularly useful for skill development because they provide learners with an opportunity to practice their skills and reflect on the experience. Thus, experiential learning methods are well-suited for working with teachers as teaching requires automating teaching skills, or the ability to engage in practiced behaviors with minimal cognitive processing.

Strategies which offer students encounter with the world will have to be employed. Adequate time after the encounter for discussion clarifications interpretation has to be provided.

Strategies such as **role play, games, simulation exercises** provide an opportunity to experiences to feel and to empathise. Methods such as laboratory **work, field visits, discussions, dramatization, seminars and projects** would involve the learners as active participants in the process of learning and make their learning more challenging enjoyable and adventurous.

Role playing provides an opportunity for learners to execute behaviors in a risk-free environment. In role playing, students assume roles and engage in hypothetical situations. Moses argues that there is not enough training for pre-service teachers in terms of developing interpersonal skills and that role playing is a useful instructional strategy for developing these skills. Errington indicates that role playing is useful because it draws attention to students' values, beliefs, and attitudes.

Manorom and Pollock identify several steps in implementing role playing in the classroom. The first step is to identify an important course objective that you would like to teach using role playing. When working with future teachers, often this objective will include the development of a teaching skill.

Next, you should find or develop a real-life scenario or situation that provides an opportunity to enact the desired teaching skill. As an example, Moses provides five role-playing scenarios targeted at helping pre-service teachers become more knowledgeable about the teaching role and the importance of interpersonal relationships. Within this scenario, you will want to identify the roles/stakeholders involved (such as students, administrators, etc.) and their perspectives. Students should be given time to examine this scenario and should select or be assigned roles.

After developing the role-playing scenario, provide classroom time for your pedagogy students to complete the role-play, or enact behaviors that will allow them to achieve the goals specified within the scenario. As an instructor, you will not generally participate in the role-playing exercise; however, you may wish to intervene if students are not actively participating. You may also want to have students switch roles at some point during the exercise.

Following the role play, students should engage in debriefing in which they reflect on how they felt and behaved during the experience, how their behaviors impacted others, what they learned, and the knowledge or skills which they would like to further develop.

Using these types of experiences let us discuss some strategies of learning teacher dominated Methods

Notes

11.9 TEACHER DETERMINED METHODS

Teachers are the main authority figure in this method. Student's primary role is to passively receive information (via lectures and direct instruction) with an end goal of testing and assessment. It is the primary role of teachers to pass knowledge and information onto their students. In this method, teaching and assessment are viewed as two separate entities. Student learning is measured through objectively scored tests and assessments. In the teacher determined method the teacher occupies the primary place in the teaching environment and pupils become secondary. The content to be taught will be decided by the teacher himself. He considers himself an ideal man. He seldom cares for the needs, interest, attitudes capacities and abilities of the pupils. He only tries to impose knowledge in the minds of the students by compulsion.

In such condition children do not have any freedom to express themselves in the teaching learning situation. Such type of education wants to make children store house of facts without giving them chance to express their mind. Cognitive development of children do not get importance. Teacher determined method otherwise known as autocratic teaching strategy includes the following methods of teaching

- Lecture method
- Demonstration method
- Tutorial method

11.9.1 LECTURE METHOD

It is a traditional teaching method and also known as method of instruction. But at present there is a maximum use of this method in colleges. According to the content and the situation arising lecture may be made lengthy or short.

In the lecture method teaching generally imparts lengthy or short explanation to clarify his is ideas about some facts to the children. It is an one channel method. Here emphasis is laid on the presentation of the content to achieve the cognitive and affective objective of teaching. Teachers are more active here in the lecture method and children have to sit like a passive listeners. Sometimes only occasionally the teacher asks questions to the children to keep them attentive in the class. Teacher controls the whole situation and plans the activities of the students.

Principles of teaching through lecture method are follows

1. The content to be taught is presented as whole.
2. There is an assumption that student can learn better through listening.

3. More emphasis is laid on the presentation of the content.
4. The teacher while teaching correlates the subject-content with other subject.
5. New knowledge is linked with student's previous knowledge.

Notes

Advantages

The major advantages of lecture method are as follows:

a. Students develop the habit of concentrating for a long time.
b. It is very much economical with regard to time factor. A large subject content may be thought comparatively in small duration.
c. It helps to realize the highest order of cognitive objectives.
d. The teacher can easily introduce a new content.
e. The teacher can use different types of teaching aids when he feels them necessary.
f. Here the teacher communicates with the students through verbal media.
g. Students are highly influenced by the personality of the teacher.

11.9.2 DEMONSTRATION METHOD

Demonstration method is a traditional classroom method. Here verbal interaction is used to occur between the teacher and the pupils. This interaction provokes students to acquire new knowledge by asking question to the teacher. For successful application of demonstration method some different techniques such as verbal presentation, exposition, description etc. should be followed by the teacher, Although demonstration method is mostly used in the teaching of science subject, other subjects like arts, craft and other experimental subjects can also be thought successfully through this method. This method is mostly used by the teacher educators during practice teaching.

Steps in the demonstration method

There are three steps in the demonstration method

Introduction b. development and c. integration

1. Introduction step aims of the content are stated. In the second phases a good deal of question answers and other class activities occur. In the last step learning material is practiced reexamined

corrected and evaluated. Precautions to be taken of suggested to be followed while administering the demonstration method are:

Notes

2. The size of the objects used in the demonstration method should be such that it can be easily seen by all students without any difficulty.
3. Language used at the time of the demonstration should be familiar with the students. Tough and ambiguous word should not be used by the demonstration. Simple, clear and interesting language should be used so that learner can follow easily.
4. In the demonstration method children should be given the chance to clear their individual doubts by asking independent questioning to the teachers.
5. Successful demonstration of the lesson depends upon the skill of the teachers.

Limitation

Demonstration method has the following limitations

It never gives scope to develop the originality of the pupil teachers because they try to imitate the skill of the model lesson demonstrated in their teaching.

Teacher educators who are demonstrating the model of a lesson to the pupil teacher may not demonstrate correctly or effectively.

11.9.3 TUTORIALS

In the class teaching method the pupil teacher ratio is not properly maintained. As a result a large group is to be taught by one teacher. In such a system it is difficult for a teacher to solve the personal problem of every pupil. If a teacher tries to give individual attention to each learner, he cannot finish his fixed syllabus within the allotted time. But there are some students who need individual care. To meet the requirements of the individual student tutorial method is developed. In the tutorial method students are divided in two small groups where every can come nearer to the teacher with his or her personal problems these small group teaching are known as tutorials.

Tutorials is a sub part of the class teaching method In the tutorial system the teacher tries to solve the problem of small groups of pupils by paying individual attention to each and every pupils of the group.

On the basis of the mode of discussion and teaching tutorial system may be named under three categories

a. Group tutorial
b. Supervised tutorial and
c. practical tutorial.

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Group tutorial: In the group tutorial system the teacher tries to solve the problems of a group tutorial teachers must possess knowledge o group dynamics and social psychology. This knowledge can help the teacher to deal with the group effectively and solving their problems pleasantly.

Supervision tutorial: In this system problems are discussed among the talented pupil and the teacher frequently on the need basis. Problems faced by the student are put to the teachers. The teachers in consultation with the student tries to solve the problem. Through interaction of thoughts and idea they become able to derive solution to the problem.

Practical tutorial: practical tutorial can be used for both group and individual student. It is generally held in the laboratory where pupils to work. The main purposes of practical tutorial are to develop the physical skill and psychomotor skills. This method is more useful for younger children and lower class pupils as secondary in the tutorial system and the lecture of the teacher gets more importance then this type of practical tutorial will come under automatic strategy. Conversely if the pupils become more active instead of the teacher in the practical tutorial this type of practical tutorial occupies its place in democratic strategy.

Advantages of tutorial

- Individual differences of the learner get consideration
- It fulfills the need of entry behavior of the learner
- It provides an opportunity for remedial teachers
- Here the students get full freedom to clarify their problems and thereby they can raise their knowledge and level of performance.

Principles of tutorial

The teaching principles underlying tutorial strategy are:

- It gives importance to the individual differences of the learner
- It establishes a sympathetic and harmonious relationship of the teacher with the learner.
- It makes provision for education guidance
- It provision remedial help to the weak students

Limitations

- Teacher may become bias and may not give due interest to the problems faced by each and every students

Notes

- In the group tutorial some students dominate the whole group and the rest may not gain opportunity to solve their problem

Check Your Progress

Notes :

a. Write your answers in the space given below. Compare your answers with those given at the end of the unit

True or False

7. Role play provides an opportunity to experience, to feel and to empathies

8. Field visits involve the learners as a passive participant

11.10 LET US SUM UP

Experiential learning is an approach to education that focuses on "learning by doing," on the participant's subjective experience. The role of the educator is to design "direct experiences" that include preparatory and reflective exercises.

In this unit, we started our discussion with presentation of two cases of organising learning experiences. From these cases, we built up the major principles of organising learning experiences. In the first case, we demonstrated how a learning task like letter-writing could be organised by the English teacher. There are certain situations where on the stop decision have to be taken about organisation of learning experiences. In the second case, we presented how a math teacher changed her original plan while teaching about angle. Based on these two cases, we arrived at ten principles of organising learning experiences.

11.11 UNIT-END ACTIVITIY

What type of learning styles would benefit the slow learners and the gifted?

11.12 POINTS FOR DISCUSSION

i. Will 'Dramatic activities' enhance the learning skill of students.
ii. Point out the advantages of Activity based learning

11.13 ANSWERS TO CHECK YOUR PROGRESS

Answers

1. Negotiate
2. Personalised
3. False
4. True
5. a
6. c
7. True
8. False

11.14 SUGGESTED READINGS/REFERENCES

Notes

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Notes

UNIT-XII DEVELOPING LEARNING SKILLS - I

STRUCTURE

12.1 INTRODUCTION

In any system of education, learning outcomes and students achievement is of major concern as these are thought to be the determinants of evaluative aspect of education. Though the academic achievement of students depends on various factors such as the students desire to learn, instructional strategies, study materials, students study skills, etc., the learning skills of students are thought to play an important role in the academic achievement. Researches focusing on students learning skills and difficulties in learning from text have found that most students do not have appropriate and efficient strategies necessary for learning on their own, Students generally need guidance.

There can be many plausible explanations regarding why students lack the strategies necessary for independent learning. However, the most obvious reason is the lack of systematic instruction on learning strategies in our institutions. Students lack of control over strategy appears to be another well supported explanation of why so many students are not effective and efficient independent learners, Adequate learning skills among students enable them to become independent learners both in and out of schools. In this unit, we discuss the skills of learning independently.

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It is to be borne in mind that Learning skills have been understood differently by different people and have been used inter-changeably with study skills. Nevertheless, they all talk about competencies or skills associated with acquiring, organising, synthesizing, remembering, and using information and ideas read in books, observed or listened to in different situations. We should remember that Learning is a lifelong process, and in the whole spectrum of education, our focus is on enhancing certain competencies and skills in learning. Hence, skills in learning refer to students' development of confidence and competence in learning. While confidence in learning depends on the students' motivation, self-interest, positive attitude to learn, etc., competence in learning comes from specific activities a student is engaged in while doing a particular learning task.

It is in vogue that, the three R's i.e., reading, writing and arithmetic are the three basic learning skills. However, there are a number of sub-skills involved in each of these and they are interrelated and complementary to each other. In addition to these, there are certain subject-specific learning skills which are required to accomplish learning activity in that particular subject. These subject-specific learning skills differ from subject to subject. For example, the skills for learning mathematics vary considerably from the skills required for learning a language or any other subject, say music/dance.

12.2 OBJECTIVES

After going through this unit you will be able to explain the learning styles

- Explain the learning styles
- Realize the importance of learning strategies
- Understand the concept of metamemory Get knowledge in meta comprehension, note taking and underlining

12.3 STAGES IN THE PROCESS OF LEARNING

It is evident from the above that essentially there are three stages in the process of learning; namely, acquiring, synthesizing, and applying new information knowledge. There are different skills or a set of skills required in accomplishing each stage and each of these functions requires specific skills to do it effectively. For example, acquiring information or knowledge can be accomplished through reading, listening, observing, etc. The skills required in these stages are:

Acquisition

Acquiring new knowledge/information is one of the most important pre-requisite of the learning processes. We acquire most of our knowledge through reading, listening and observation. While one interacts with text, listens to someone or observes certain event, a number of new concepts, new ideas, new words and new symbols come all along in the way. The act of analysing these concepts, ideas, symbols etc. is to find out their underlying meaning and making sense out of them, is known as acquisition.

Reading

It is one of the major means of acquiring new knowledge. It is a constructive process which involves both reconstructing an author's message and constructing one's own meaning using the print. The process of reading requires the use of complex thought procedures to interpret printed symbols as meaningful units and comprehend them as thought units in order to understand a printed message (Collins and Cheed, 1993).

It is a "selective process of attending to hearing, understanding and remembering oral (and at times visual) symbols" (Barker, 1971). The process of listening begins with receiving a message, interpreting it and understanding the meaning. Effective listening requires the listener to hear what the speaker said, without a biased pre-selection (I hear what I want to hear) interpret it accurately, and understand the meaning. Usually, the interpretation part in listening is difficult because of the symbolic nature of communication (Gleans and Briihart, 1993).

Observation

It is similar to listening, except that in observation, interpretation and understanding are based on the visual symbols unlike in listening; where it is essentially based on the aural symbols. It is a process of perceiving visual symbols, interpreting them, understanding the meaning and • relating it with prior knowledge.

As in listening, the limitation in this is that the process of observation is selective, i.e. determined by the observer's interest. At the same time, one need not hear or observe everything that is said to be spread around your eyes. How to select what is crucial and not waste the time in hearing/seeing that is not crucial-important is a problem for every person and hence one has to learn the skill of listening/observing systematically and not take it as natural process.

Synthesizing

It requires the learner to make sense out of the information acquired and relate it to the previous knowledge. While synthesizing the ideas, the learner categorizes, organises, and combines the newly-learned ideas; and creates, devises, designs, explains, generates,

modifies the ideas to totally new situations to be able to see a set of abstract relations among them.

Application

It is an inevitable step in the process of learning. Most of what we learn is intended for application to problem situations in real life. Application refers to the use of the abstraction of theory, principle, concept, idea or information correctly in an appropriate situation.

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12.4 LEARNING STYLES

Learning styles in education are the systematic differences in individuals' natural or habitual pattern of acquiring and processing information in learning situations. A core concept is that individuals differ in how they learn. The idea of individualized learning styles originated in the 1970s, and has greatly influenced education.

Proponents of the use of learning styles in education recommend that teachers assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style. Although there is ample evidence that individuals express preferences for how they prefer to receive information, few studies have found any validity in using learning styles in education. Critics say there is no evidence that identifying an individual student's learning style produces better outcomes. There is evidence of empirical and pedagogical problems related to the use of learning tasks to "correspond to differences in a one-to-one fashion."

Your learning styles have more influence than you may realize. Your preferred styles guide the way you learn. They also change the way you internally represent experiences, the way you recall information, and even the words you choose. We explore more of these features in this sub section.

ACTIVITY

Identify the learning style of your learners.

Suggest some measures to improve their Learning style for effective learning.

Research shows us that each learning style uses different parts of the brain. By involving more of the brain during learning, we remember more of what we learn. Researchers using brain-imaging technologies have been able to find out the key areas of the brain responsible for each learning style. For example:

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Visual: The occipital lobes at the back of the brain manage the visual sense. Both the occipital and parietal lobes manage spatial orientation.

Aural: The temporal lobes handle aural content. The right temporal lobe is especially important for music.

Verbal: The temporal and frontal lobes, especially two specialized areas in the left hemisphere of these two lobes.

Physical: The cerebellum and the motor cortex (at the back of the frontal lobe) handle much of our physical movement.

Logical: The parietal lobes, especially the left side, drive our logical thinking.

Social: The frontal and temporal lobes handle much of our social activities. The limbic system (not shown apart from the hippocampus) also influences both the social and solitary styles. The limbic system has a lot to do with emotions, moods and aggression.

Solitary: The frontal and parietal lobes, and the limbic system, are also active with this style.

In any classroom it is not very likely that any two students learn the same thing; in the same way; at the same place. We are finally beginning to realize that in order to assist each pupil and to capitalize on his or her natural inclination to understand, we must be able not only to diagnose his or her style of learning but to accept it. There are many styles of learning, and there is no evidence to suggest that one is better than another. What is better is the style that fits each person most comfortably; what is not better is to try to fit a person into a learning mode that seems alien and strange. Once we accept (and appreciate) the idea that there are different ways of learning, each valid for particular students, then we can be free to explore various ways of teaching in order to accommodate the vast array of learner differences that confront us.

Each of us has a style of learning as individual and as our own personality. These styles could be categorized as visual (reading), aural (listening), and physical (actively doing things).

Each classroom is likely to include students whose styles of learning vary widely. Although teachers cannot cater completely to each student's particular style, they can attempt, utilize the strengths and reduce or modify the weaknesses of those in their classes.

An individual's basic style of learning is probably laid down early in life and is not subject to any fundamental change. For example, a pupil who likes to learn by listening and speaking (aural style) is unlikely to change completely and become an outstanding reader.

Notes

In the interest of effective motivation, it is important to be sensitive to each student's learning style. If for example, some students seem to learn best by reading, you might want to suggest books to them, but to call on them more often in class; to encourage them to experience more physical or verbal learning, may not be advisable. On the other hand in some cases, you might find it beneficial to encourage students to read more but not to the point of exasperation. Once we identify and become aware of each student's particular style of learning, we can build on that style, along with helping him or her experience other modes of learning. All this leads to effective learning.

We all have our preferences for learning, our own learning styles. Recently educational psychologists have begun to concentrate on the importance of learning styles. Learning styles can be defined as the normal variations in internal and external preferences for the setting and manner in which learning takes place.

Everyone has preferences for studying. Some like noise, while others can't stand any noise. Some like to hear lectures, some prefer discussion, and some would rather personally experience the thing being studied. Each student has his/her own specific preference.

One mistake occurs while analysing the learning styles. Learning styles illustrate the preferences of students for learning, and it is wrong to think that a student with a visual preference cannot learn from a lecture. Students need not always operate in their preferred mode of learning. However, there is some evidence to suggest that when students are allowed to learn using their preferred style, their achievement is more.

The Seven Learning Styles

Visual (spatial): You prefer using pictures, images, and spatial understanding.

Aural (auditory-musical): You prefer using sound and music.

Verbal (linguistic): You prefer using words, both in speech and writing.

Physical (kinesthetic): You prefer using your body, hands and sense of touch.

Logical (mathematical): You prefer using logic, reasoning and systems.

Social (interpersonal): You prefer to learn in groups or with other people.

Solitary (intrapersonal): You prefer to work alone and use self-

Notes

12.1 LEARNING STRATEGIES

Learning strategies are used by students to help them understand information and solve problems. A learning strategy is a person's approach to learning and using information. Students who do not know or use good learning strategies often learn passively and ultimately fail in school. Learning strategy instruction focuses on making the students more active learners by teaching them how to learn and how to use what they have learned to solve problems and be successful.

Learning strategies seem to be "tricks" learners how to help them remember things better or to do tasks more efficiently. Several researchers have studied what learning strategies are and why they are effective in the learning process. Oxford (1990) indicates that the word strategy originated from the Greek word 'strategia' which means generalship or the art of war. Strategy meant the management of the troops, ships, or aircraft in a war situation. Oxford continues to expand on this definition by stating that "learning strategies are specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations."

Weinstein and Mayer in Witrock (1986) have coined one definition of learning strategies as "behaviors and thoughts that a learner engages in during learning and that are intended to influence the learner's encoding process." They go on to state various learning strategies that could be used with learners.

Nisbet and Shucksmith (1986) define learning strategies simply as "the processes that underlie performance on thinking tasks."

Certain relatively generic skills facilitate learning in a broad range of situation like; reading with speed, accuracy, and comprehension; critical thinking; general principles of problem-solving, and "learning to learn" skills and study skills. As a part of the recent emphasis on cognition and human information processing, a great deal of research has been done on the development of effective strategies for learning, and on how these strategies may be taught to individuals who do not develop them spontaneously.

Learning strategy could be divided into five categories; which constitute

12.5.1 Developing Learning Skill

1. Rehearsal strategy involves actively repeating (saying, writing) material or focusing on the key parts. For brief rote learning tasks, rehearsal may involve repeating key terms aloud, copying

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the material, taking verbatim notes, or underlining important parts.

2. Elaboration strategy involves making connections between the new and the familiar. For rote learning, elaboration strategy includes forming mental images to associate with the material, generating sentences that relate to the items to be learned to more familiar items, or using mnemonic devices like the keyword method. In more complex meaningful learning, elaboration strategy includes paraphrasing, summarizing, creating analogies, taking notes that go beyond verbatim repetition to extent or comment on the material, answering questions, and describing how the new information relates to the existing knowledge.
3. Organizational strategy involves imposing structure on the material by dividing it into parts and identifying super ordinate-subordinate relationships. In simple rote learning, organisational strategy involves breaking lists into chunks. Organisational strategy for complex meaningful learning includes outlining the text, creating a hierarchy on network of concepts, or creating diagrams showing their relationships.
4. Comprehension monitoring strategy involves remaining aware of what one is trying to accomplish, keeping track of the strategy one uses and the success achieved by them, and adjusting the behaviour accordingly. This strategy includes self-questioning to check understanding, taking action when one does not understand, using statements of objectives to guide study, establishing sub-goals and assessing progress in meeting them, and modifying strategies; if necessary.
5. Affective strategy includes establishing and maintaining motivation, focusing attention, maintaining concentration, managing performance, anxiety and managing time effectively.

These relatively generic learning strategies and related cognitive skills are not only worth teaching to elementary and secondary students but are helpful in your own learning.

12.6 METAMEMORY

Metamemory refers to a person's knowledge about the contents and regulation of memory. The term originally derives from the work of John H. Flavell in the early 1970s. Metamemory enables a person to reflect on and monitor her memory. In addition, Metamemorial knowledge plays an important role in planning, allocation of cognitive

resources, strategy selection, comprehension monitoring, and evaluation of performance.

Notes

Metamemory is knowledge and awareness of your own memory, including the contents and processes of your memory. What do you remember and how confident are you in the accuracy of your memories? For example, you may realize that you have forgotten the date of a friend’s birthday, but you are 90% sure it is in July. Metamemory also includes the strategies you use to help you remember something. So if you are reminded that your friend’s birthday is on July 8th, you may make a mental note of the date and the fact that 8 follows 7 to help you remember next time.

Metamemory is the knowledge about how memory works and how to memorize effectively. Children only gradually come to learn that some kinds of material (meaningful, organized, optimizing Learning interesting) are easier to learn than others; that recognition tests are easier than recall tests; that paraphrased recall is easier than verbatim recall, or that active rehearsal will produce better results than silent reading. Training studies showed that children who were given metamemory strategy usually learned more than controlled children but often reverted to their pre-training behaviour unless continually reminded of using the strategies.

Metamemory, a type of metacognition, is both the introspective knowledge of one’s own memory capabilities (and strategies that can aid memory) and the processes involved in memory self-monitoring. This self-awareness of memory has important implications for how people learn and use memories. When studying, for example, students make judgements of whether they have successfully learned the assigned material and use these decisions, known as "judgments of learning", to allocate study time.

Thus, **Metamemory** is defined as knowing about memory and mnemonic strategies. It is an especially important form of Metacognition.

ACTIVITY

Identify some Mnemonic Techniques to increase your memory

Notes

Check Your Progress

Notes :

a) Write your answers in the space given below. Compare your answers with those given at the end of the unit

Fill in the blanks

1. …………. strategy involves actively repeating (saying, writing) material or focusing on the key parts.
2. ………..strategy includes establishing and maintaining concentration and performance.

True or False:

3. Organisational strategies involves imposing structure on the material
4. Elaboration strategy involves making correction between the new and the facilitate.

III. Objective

5. .... is the knowledge about how to memorize effectively

   a) Meta memory b) Attention

   c) Retention d) all the above

6. To retain material the study skill needed is

   a) Note Taking b) Recalling

   c) Writing d) all the above

12.7 EVALUATION

- What are the different stages in Process of Learning
- Mention briefly about the Learning strategies.
- Explain in detail about the development of learning skills
- Indicate the importance of Metamemory.

12.8 LET US SUM UP

In this unit, we started our discussion with the concept of learning skills. Learning skills refer to students' development of confidence and competence in learning. There are three stages in the process of learning, namely; acquiring, synthesizing and applying new information. We also discussed about learning styles. These styles are broadly categorised as "visual (reading), Aural (listening), and Physical (actively doing things). Learning strategies were then highlighted. There are given categories of learning strategies. These are, rehearsal

strategy, elaboration strategy, organizational strategy, comprehension monitoring strategy and affective strategy. We discussed about Metamemory.

UNIT-END ACTIVITIES

Notes

Point out the different types of activities that can be engaged to attain learning experience.

12.9 POINT FOR DISCUSSION

Identify the occasions for harnessing learning styles and learning strategies under relevant context

12.10 ANSWERS TO CHECK YOUR PROGRESS

1. Rehearsal
2. Affective
3. True
4. True
5. A
6. a

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UNIT-XIII - DEVELOPING LEARNING SKILLS - II

Notes

STRUCTURE

13.1 INTRODUCTION

The term Metacognition refers to a learner's ability to be aware of what they are thinking about and choosing a helpful thought process. It captures learner's ability to analyse how they think, have high self-awareness and control of their thoughts and choose an appropriate and helpful strategy for the task at hand. Research suggests that metacognition is one of the most effective and cost efficient ways to help learners making gains in their learning. Evidence shows that learner's using metacognitive strategies improve in their academic achievement. It is nothing but an ability to critically analyse how you think and have high self-awareness and control over your thoughts.

There are different forms of metacognition. These include: Metacognitive knowledge - this refers to your awareness about what

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you do or don't know. It is similar to knowing your strengths, weaknesses and any gaps in your knowledge. Metacognitive regulation refers to the different strategies students use to manage their thoughts and emotions. This includes how well students plan, monitor and evaluate their performance. Inner drive, an organisation from London noted that metacognition is not the same as self-regulation.

Metacognition describes the ability to be aware of your thoughts and choose helpful strategies. Self-regulation describes the act of staying calm and focused. Improving one is likely to improve the other. And metacognition is not as same as 'thinking about your thinking'.

'Thinking about your thinking' describes part of metacognition, in that it describes becoming more aware of your thought processes. Metacognition takes things a step further as, after this level of self-awareness, students should actively channel their thoughts towards effective strategies (Inner Drive, London).Examples of metacognitive activities include planning how to approach a learning task, using appropriate skills and strategies to solve a problem, monitoring one's own comprehension of text, self-assessing and self-correcting in response to the self-assessment, evaluating progress toward the completion of a task etc., Thus, in this unit an attempt has been made to describe about metacognition, Metacomprehension and problem solving techniques.

13.2 OBJECTIVES

After going through this unit you will be able to explain the learning styles

- Realize the importance of Metacomprehension
- Understand the concept of metacognition
- Explain the metacognitive strategies
- describe the problem-solving strategies

Get knowledge in meta comprehension, note taking and underlining

13.2.1 METACOGNITION

Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress toward the completion of a task are metacognitive in nature.

The term **Metacognition** refers to the knowledge about cognitive processes and how they function, and the term metacognitive

awareness refers to a person's conscious monitoring of his or her own cognitive strategies during the process of applying them.

Metacognition is often simply defined as "thinking about thinking."The term "metacognition" is most often associated with John Flavell, (1979). According to Flavell (1979, 1987), metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. Flavell further divides metacognitive knowledge into three categories: knowledge of person variables, task variables and strategy variables.

Metacognition is defined as "cognition about cognition", or "knowing about knowing". It comes from the root word "meta", meaning beyond. It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving. There are generally two components of metacognition: knowledge about cognition, and regulation of cognition.

"**Metastrategic knowledge" (MSK)** is a sub-component of metacognition that is defined as general knowledge about higher order thinking strategies. MSK had been defined as "general knowledge about the cognitive procedures that are being manipulated". The knowledge involved in MSK consists of "making generalizations and drawing rules regarding a thinking strategy" and of "naming" the thinking strategy.

Metacognition is the understanding and awareness of one's own mental or cognitive processes.

Metacognition Examples:

There are many possible examples of metacognition. These examples may help to gain a better understanding of the concept. Below are some examples of metacognition:

a. A person learns about his or her own style of learning.

b. A person learns about what things help him or her to remember facts, names, and events.

c. A person becomes aware of his or her own biases in judging others.

d. A person learns about what strategies are the most effective in solving certain problems.

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13.2.2 METACOMPREHENSION STUDY

Metacomprehension is a type of metacognition that involves knowledge of which version of the perceived information is correct or incorrect.

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Metacomprehension is a relatively basic concept in metacognition. Metacognition is simply how one thinks about their own thinking. Due to the abstract nature of the concept, however, it was over-looked as a function in psychology for quite some time. **Comprehension** is what one understands and is a term that is often related to reading and learning but is also very involved in all applications of memory. **Metacomprehension** is an individual's own conscious knowledge of their level of comprehension. It is what a student knows about what they have learned and on a more convoluted level, what they know they know.

A particularly interesting sub-topic in research on metacognition is the study of metacomprehension; the strategy that readers use in monitoring, evaluating, and repairing their comprehension during reading. Children can use monitoring strategy that helps them understand what they read and remember in an organised way. This strategy includes identifying relevant background knowledge, generating and responding to questions about the material, making connections between its parts, drawing inferences from it, and summarizing and organizing it. Unfortunately, students rarely receive instruction in these comprehension-monitoring strategies in typical classrooms. Thus, it is important for teachers at all grade levels to be aware of this strategy and prepare themselves to teach them to students who do not use them spontaneously.

13.3 NOTE TAKING

Note-taking is the practice of recording information captured from another source. By taking notes, the writer records the essence of the information, freeing their mind from having to recall everything. Notes are commonly drawn from a transient source, such as an oral discussion at a meeting, or a lecture (notes of a meeting are usually called minutes), in which case the notes may be the only record of the event. Note taking is a form of self-discipline.

To retain material for future use, it is usually necessary not only to study it in an active systematic way but to be able to take notes or in some other way preserve key ideas in a form that makes them easy to refer to later on.

13.4 UNDERLINING

Underlining and highlighting important materials palpable are among the study techniques used by most of the school students. Underlining appears to be less effective than other note taking techniques. However, it is comparatively passive, and it psychologically defers, the active learning process to some future time. Also, many students use it ineffectively because they underline too much or underline before they have absorbed enough of the material to knew which parts are most important. Thus, underlining may be most useful if done only after reading through the material the first time.

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13.5 MARGINAL COMMENTS AND CODING SYSTEMS

Marginal comments include questions like rephrasing of difficult sentences, and definitions of unfamiliar words. The coding systems include colour coding (using markers) to indicate main ideas and separate them from supporting evidence, circles around to indicate new terms, arrows indicating relationships between ideas, boxes to contain related ideas, marginal numbers to indicate sequential patterns, marks stars to indicate the important ideas, or question marks to indicate disagreement with the author. Marginal comments or coding systems involve the reader more actively in the author's presentation than mere underlining does.

Check Your Progress

Notes : a) Write your answers in the space given below. Compare your answers with those given at the end of the unit

1. Learning focuses on enhancing …………… and skills in learning
2. Learning styles could be categorised as visual, a rural and ……………..

True or False :

3. Note taking in the form of written summaries is likely to facilitate learning
4. Marginal comments include questions and definition of unfamiliar words.

III. Objective:

5. Meta comprehensions uses ……..evaluating and repairing their comprehensions.
   a) Monitoring b) accelerating c) checking
6. When comprehension faces taking ……………. is taken by skilled readers.

Notes

13.6 PROBLEM-SOLVING STRATEGIES

A problem is a chance for you to do your best.

--Duke Ellington

What is Problem Solving? According to Mayer and Wittrock, problem solving is “cognitive processing directed at achieving a goal when no solution method is obvious to the problem solver” (2006). This definition consists of four parts:

1. problem solving is cognitive, that is, problem solving occurs within the problem solver's cognitive system and can only be inferred from the problem solver's behavior,
2. problem solving is a process, that is, problem solving involves applying cognitive processes to cognitive representations in the problem solver's cognitive system,
3. problem solving is directed, that is, problem solving is guided by the problem solver's goals, and
4. problem solving is personal, that is, problem solving depends on the knowledge and skill of the problem solver.

Thus, **problem solving** is cognitive processing directed at transforming a problem from the given state to the goal state when the problem solver is not immediately aware of a solution method.

According to Mayer and Wittrock (2006), students need to have five kinds of knowledge in order to be successful problem solvers:

1. **facts**: knowledge about characteristics of elements or events, such as “there are 100 cents in a dollar”;
2. **concepts:** knowledge of a categories, principles, or models, such as knowing what place value means in arithmetic or how hot air rises in science;
3. **strategies**: knowledge of general methods, such as how to break a problem into parts or how to find a related problem;
4. **procedures**: knowledge of specific procedures, such as how to carry out long division or how to change words from singular to plural form; and
5. **beliefs:** cognitions about one's problem-solving competence (such as “I am not good in math”) or about the nature of problem solving (e.g., “If someone cannot solve a problem right away, the person never will be able to solve it”).

Besides being able to read with comprehension and study efficiently, students need to learn, how to solve problems effectively -

not just in mathematics, but in any subject area. A problem exists when a person perceives a need to achieve some goal but does not immediately know how to achieve it. Some problem solving strategies are discussed below:

Optimising Learning

Algorithms

Well-structured problems present both a clearly defined goal and all the information required to solve the problems using appropriate algorithms (fixed rules or procedures that guarantee correct answers if followed precisely, such as the rules for whole-number addition). In contrast, ill-structured problems are more, difficult to define, let alone solve. The person is aware that a problem exists but may not be clear about what information will be required to solve it, where this information can be obtained from, or how to apply it. There may not even be a single correct answer.

Heuristics

Ill-structured problems must be attacked by using heuristics- general rules of thumb and procedural guidelines for processing information and solving problems, such as, identifying what information is given and what is required. Heuristics do not guarantee solutions the way algorithms do, but they are applicable of a range of problems and allow people to discover solutions for themselves. Thus, well-structured, home-work problems in Mathematics or Science are solved using algorithms but ill-structured problems such as predicting changes in market conditions or discovering cures for diseases require Heuristics.

Educational psychologists have long been interested in identifying ways to teach people to solve problems effectively. Pessimists believe that problem-solving cannot be taught directly although students will benefit from frequent opportunities to develop their problem-solving skills through practice. Optimists, on the other hand, believe that problem-solving skills can be developed directly by teaching students effective problem-solving heuristics.

John Dewey had suggested steps for effective problem-solving:

Step -1Presentation of the problem: Become aware of the problems or be made aware of them.

Things you may do in this step:

Break the problem down into pieces, elements, or components.

Notice how the pieces or components are related to each other.

Look for missing information or gaps in what you know.

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Make note of the information that you do not have or cannot find, or that is unavailable.

Separate symptoms from underlying causes.

Avoid judgments and premature solutions.

Gather information.

Step -2 Definition of the problem: Define the problem by identifying the present state and the desired goal states and consider the implications for the solution. Sometimes, a problem can be defined in different ways, with various solution implications.

Things you may do in this step:

Gather information that you need to know more about the context surrounding this problem.

Decide which pieces of information are important.

Identify your point of view.

Consider how your cultural values shape your perception of the problem.

Evaluate conflicting evidence.

Separate symptoms from underlying causes.

Avoid value judgments.

Avoid premature solutions.

Analyze arguments.

Identify the things you do not understand.

Identify the complexities of the problem.

Define a research problem.

Step -3 Development of hypotheses: Given the problem definition,, generate hypotheses for solving it.

Things you may do in this step:

Consider the evidence for and against your theory or viewpoint.

Consider the evidence for and against other theories or viewpoints.

Analyze arguments.

Imagine the implications of each possible solution.

Formulate research questions or hypotheses.

Step -4 Testing of hypotheses: Identify the advantages and disadvantages associated with each proposed solution.

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Things you may do in this step:

Develop an action plan.

Test research questions or hypotheses.

Step-5 Selection of the best hypotheses: Identify the solution that offers maximum advantages and the fewest disadvantages.

Contemporary views of problem-solving reflect the ideas about human information processing. Expert problem solvers do not proceed in the rigid manner implied by Dewey's stages (in particular, they do not generate a large number of hypotheses and then test each one). Instead, they conceptualize the problems by identifying key features and relate them to background knowledge and then identifying only one or a few promising hypotheses for testing. For example, physicians diagnosing medical problems do not begin by listing every conceivable source of the symptoms. Instead they ask questions designed to quickly narrow the search to a few probable diagnoses and then pursue them.

The task environment is the large structure of facts, concepts, and their interrelationships within the problem is embedded. The problem space is the problem solver's mental representation of that task environment. The problem space must simplify the task environment enough to allow the person to address the problem within the ones of working memory and yet be an accurate representation to foster effective problem-solving efforts.

Accurate representation of the problem is the key to the success of this method. If the problem is represented inappropriately, the resulting solution efforts will fail, and the person will have to begin all over again. In well-structured problems, accurate representation may be followed by activation of algorithms that lead directly to a solution. On the other hand, in ill-structured problems, the person may have to rely on heuristics such as reasoning by analogy from more familiar problems, working on sub-parts before dealing with the whole, working backwards from proposed solutions, or testing the most promising hypotheses first.

13.7 EVALUATION

- Mention examples for Metacognition.
- What do you mean by Metacomprehension?
- Explain various steps involved in Problem Solving

13.8 LET US SUM UP

In this unit, we started our discussion with the concept of Metacognition and Metacomprehension. *Metacognition* is "cognition about cognition", "thinking about thinking", "knowing about knowing",

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becoming "aware of one's awareness" and higher-order thinking skills. The term comes from the root word meta, *meaning* "beyond". We discussed certain strategies related to Metamemory, Metacognition, Metacomprehension and others. Study skills were also touched, upon. Study skills are note taking, underlining, marginal comments and coding systems and summarising. Problem-solving strategies like; Algorithms and Heuristics were discussed. In the end, we presented the various steps involved in problem solving.

13.9 UNIT-END ACTIVITIES

Point out the different types of activities that can be engaged during study skills.

13.10 POINT FOR DISCUSSION

Identify some problems and issues which can be solved through Problem Solving strategies.

13.11 ANSWERS TO CHECK YOUR PROGRESS

1. Competencies
2. Physical
3. True
4. True
5. A
6. Correctiveness

13.12 SUGGESTED READINGS/REFERENCES

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UNIT XIV - EVALUATION OF EDUCATIONAL TECHNOLOGY

Notes

STRUCTURE

14.1 INTRODUCTION

Educational technology can be a powerful tool in improving learning outcomes of students. It can help educators widen the horizons of students and allow them to explore the boundaries of their freedom.

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It can add value to each teacher's lesson and give greater depth to each school's curriculum. However, in order to utilize educational technology to its maximum potential, educators must take steps to evaluate the value of educational technology in their schools.

Educational Technology influences in teaching/learning process with the main purpose of making the system efficient and effective. In other words, appropriate use of educational technology can make teaching/learning process efficient and effective. Moreover, while using Educational Technology, you must be careful about the use of valid media, methods and materials. In this context, you will have to evaluate Educational Technology, In this unit the concept of evaluation, different types of evaluation and different kinds of evaluation s in Educational Technology are discussed.

14.2 OBJECTIVES

After going through this unit you will be able to explain the learning styles

- Define the term Evaluation
- Explain the concept Evaluation in Educational Technology
- Realize the need for Evaluation Educational Technology
- Understand the concept of Management in the Context of ET

14.3 EVALUATION

Evaluation is a process that critically examines a program. It involves collecting and analyzing information about a program's activities, characteristics, and outcomes. Its purpose is to make judgments about a program, to improve its effectiveness, and/or to inform programming decisions (Patton, 1987).

Definitions of Evaluation

Probably the most frequently given definitions are:

"Evaluation is the systematic assessment of the worth or merit of some object".

"Evaluation is the systematic acquisition and assessment of information to provide useful feedback about some object".

Both definitions agree that evaluation is a systematic endeavor and both use the deliberately ambiguous term 'object' which could refer to a program, policy, technology, person, need, activity, and so on. The latter definition emphasizes acquiring and assessing information rather than assessing worth or merit because all evaluation work involves collecting and sifting through data, making judgements about the

validity of the information and of inferences we derive from it, whether or not an assessment of worth or merit results.

14.3.1 PURPOSE OF EVALUATING EDUCATIONAL TECHNOLOGY

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The main purpose of evaluation in educational technology is to determine the quality of a program by formulating a judgment. There are two function considering to the evaluation purpose Formative Evaluations provide the information on the improving a product or a process Summative Evaluations provide information of short-term effectiveness or long-term impact to deciding the adoption of a product or process.

There are innumerable objectives of conducting evaluation of Educational Technology. One is to judge the merit, value or worth of Educational Technology. In other words, you may be curious to know about the effectiveness of Educational Technology. Broadly, effectiveness means achievement of objectives of a project, materials or techniques. While adopting Educational Technology in teaching/learning activities, you would intend to judge to what extent the objectives behind application of Educational Technology have been achieved.

An important purpose of evaluation of Educational Technology is to bringing about improvement in application of Educational Technology in teaching/learning system. Evaluation can give feedback about decisions on programme implementation. Evaluation influences policy decision on use of Educational Technology in different contexts, designs, personnel and budgeting.

Evaluation also serves the purpose of many political decisions. Evaluation findings can be used increasingly by the State and Central Government to create advocacy for particular legislation and budget appropriations. Evaluation of Educational Technology is treated as an important tool of management of educational setup especially in the case of distance education institutions like open universities/open schools. For example, cost benefit evaluation of Educational Technology will indicate whether the programme produces benefits that justify its costs. Moreover, the accountability of managers looking after Educational Technology projects can be studied in the context of results produced by Educational Technology programmes. Thus the Evaluation of Educational Technology would be useful in the following ways;

i) judging the effectiveness of Educational Technology;

ii) determining the efficiency of Educational Technology in, terms of cost benefit and time; and

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iii) getting feedback for decision-making in the context of design of Educational Technology, implementation, and budget.

14.3.2 TYPES OF EVALUATION

Evaluation can be classified from different perspectives like; norm referenced Evaluation and criterion referenced evaluation, Product evaluation and Process evaluation; Objective based evaluation and Goal free evaluation; Summative evaluation and Formative evaluation; Scientific approaches to evaluation and Humanistic approach to evaluation.

Norm Referenced Evaluation

A norm-referenced test scores a test by comparing a person's performance to others who are similar. You can remember norm-referenced by thinking of the word 'normal.' The object of a norm-referenced test is to compare a person's performance to what is normal for other people like him or her.

But norm-referenced tests aren't perfect. They aren't completely objective and make it hard to know anything other than how someone did in comparison to others. But what if we want to know about a person's performance without comparing them to others?

Criterion-Referenced

A criterion-referenced test is scored on an absolute scale with no comparisons made. It is interested in one thing only: did you meet the standards?

A criterion-referenced test is one that provides for translating test scores into a statement about the behavior to be expected of a person with that score or their relationship to a specified subject matter. Most tests and quizzes that are written by school teachers can be considered criterion-referenced tests. The objective is simply to see whether the student has learned the material. Criterion-referenced assessment can be contrasted with norm-referenced assessment.

The following table describes the differences between Criterion referenced test and norm referenced test as suggested by Popham, J. W. (1975).

Dimension	Criterion-Referenced Tests	Norm-Referenced Tests
Purpose	To determine whether each student has achieved specific skills or concepts. To find out how much students know before instruction begins and after it has finished.	To rank each student with respect to the achievement of others in broad areas of knowledge. To discriminate between high and low achievers.
Content	Measures specific skills which make up a designated curriculum. These skills are identified by teachers and curriculum experts. Each skill is expressed as an instructional objective.	Measures broad skill areas sampled from a variety of textbooks, syllabi, and the judgments of curriculum experts.
Item Characteristics	Each skill is tested by at least four items in order to obtain an adequate sample of student performance and to minimize the effect of guessing. The items which test any given skill are parallel in difficulty.	Each skill is usually tested by less than four items. Items vary in difficulty. Items are selected that discriminate between high and low achievers.
Score Interpretation	Each individual is compared with a preset standard for acceptable achievement. The performance of other examinees is irrelevant. A student's score is usually expressed as a percentage. Student achievement is reported for individual skills.	Each individual is compared with other examinees and assigned a score--usually expressed as a percentile, a grade equivalent score, or a stanine. Student achievement is reported for broad skill areas, although some norm-referenced tests do report student achievement for individual skills.

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Product Evaluation

'Product Evaluation' indicates the strengths and weaknesses of Educational Technology. Whether Educational Technology has been successful in producing expected outcomes or not; to what extent it has been successful in this direction; what are the limitations of products of Educational Technology can be identified through product evaluation.

Process Evaluation

It indicates whether programme implementation follows appropriate paths or deviates from them. Monitoring the day-to-day operations of a programme and record keeping may generate a lot of data to identify strengths and weaknesses in the procedures adopted therein. It helps us in making on the spot decisions about the programmes, bringing suitable modifications in the strategy etc. For example, you want to assess the impact of lecture method on the students' learning outcomes, you assess the processes of lecture cum demonstrates i.e. planning for the lecture cum demonstrate introducing the lecture cum demonstrate presenting the lecture cum demonstrate and evaluating the lecture. At each stage of the processes, you may evaluate the lecture method and ensure that it follows the right path.

14.3.3 SUMMATIVE EVALUATION

In summative evaluation, programs or projects are assessed at the end of an operating cycle, and findings typically are used to help decide whether a program should be adopted, continued, or modified for improvement.

It denotes evaluation of product of Educational Technology at the end of its implementation. There may be several criteria to judge the worth of Educational Technology towards the completion of the project. It reveals whether Educational Technology has been 'successful' or 'unsuccessful'; 'worth' or 'worthless' at the completion stage.

14.3.4 FORMATIVE EVALUATION

In formative evaluation, programs or projects are typically assessed during their development or early implementation to provide information about how best to revise and modify for improvement. This type of evaluation often is helpful for pilot projects and new programs, but can be used for progress monitoring of ongoing programs.

It connotes evaluation of performance of Educational Technology from time to time. The evaluation may be continuous in nature. Evaluation of performance at the end of a unit may help us to bring improvement in the process to be adopted for consecutive units. For instance you use inquiry model of teaching concepts in science

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classes. You can evaluate the impact of inquiry model from time to time.

> Which one is recommended? - Summative evaluation? or formative evaluation?
>
> Both evaluation methods are recommended for use, when possible, to provide program staff with ongoing feedback for program modifications (formative) as well as periodic review of long-term progress on major program goals and objectives (summative), and to meet regular reporting requirements.

14.3.5 OBJECTIVE-BASED EVALUATION

It means evaluating worth of Educational Technology against the criteria of pre specific objectives. The expected outcome of Educational Technology is pre determined. The evaluation indicates the success or failure of Educational Technology in the context of achievement of objectives. Of course, another development has taken place in this context. That is whether the objectives are worth or worthless should be determined first. Evaluation of objectives helps the developers determine what the goals of the Educational Technology programme should be. Once suitable objectives are finalized, the evaluator's major task is to determine the extent to which the programme achieves the objectives in practice.

14.3.6 GOAL FREE EVALUATION

Goal free evaluation proposes that the evaluation should not be conducted against the pre-determined goals. The evaluators should not know the programme goals in advance. Instead the evaluator should discover the actual effects of the programme in operation. It is done to avoid the evaluator's bias in only concentrating on pre-specific outcomes and overlooking other effects of programme, especially adverse side effects.

14.3.7 DIFFERENT APPROACHES TO EVALUATION

There are many approaches to evaluation of Educational Technology. In this sub section a brief discussion has been made about them.

Scientific approach to evaluation follows pre-specific research design. The criteria of judgement or effectiveness are determined prior to execution of the programme. The tools for measuring the effects against different criteria are developed in advance. The evaluators are trained about their objective roles, especially in the context of administration of tools, data collection, analysis and interpretation of data. Evaluation is conducted objectively as per pre-specific design.

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14.3.8 HUMANISTIC APPROACH

It aims at illuminating decision makers about the process of implementation of a project. The issues and concerns of persons having stake over the project are highlighted and discussed in detail. The operational parts of a programme, the constraints involved in execution, positive and negative effects of operation of a programme are described qualitatively. The evaluation does not follow pre-specific design. The evaluator adopts qualitative methods like participant observation, interviews, continuous interactions and experience notes to describe programme implementation.

14.4 MODEL OF EVALUATION OF EDUCATIONAL TECHNOLOGY

There are many models of conducting programme evaluation studies. Since Educational Technology is directly linked with operational component of Educational System, we can use a popular model of evaluation called Context Input Process and Product (CIPP) Model. This model is treated as one of the best models of evaluation to assist decision-making various component of this model are presented hereunder components of CIPP Model

i. Context Evaluation

ii. Input Evaluation

iii. Process Evaluation

iv. Product Evaluation.

Context Evaluation

It involves assessment of needs and identification of problems concerning specific instructional set-up. The analysis of existing situations concerning practices, problems, constraints, facilities etc. helps us to know where we stand. Further, we can proceed towards identifying desirable situations. This helps us to prioritise the needs.

Input Evaluation

It is concern with judgement about the resources and strategies needed to accomplish programme objectives. The evaluator collects all possible information about alternative facilities both material and human. He makes judgement about the worth of resources and strategies and chooses the best possible resources and strategies within certain constraints. Input evaluation requires us to have a "wide range of knowledge about all possible resources and strategies, as well as the strength of strategies in achieving different outcomes of the programme.

Process Evaluation

It involves evaluation of means of operation of a programme. All possible information about operational component are gathered. The record of programme events is kept over a period of time. The day-to-day monitoring is done regarding the operation of a project. The strength and weakness of different means, techniques, approaches are identified. Appropriate decision can be taken on time regarding modification of process, if required.

Product Evaluation

As presented earlier, the product evaluation aims at determining the extent to which the goals of the programme have been achieved. Different tools are developed and administered concerning different criteria. Product evaluation helps decision makers whether to continue with programme with suitable modifications or not.

14.4.1 QUALITY IN EVALUATION OF EDUCATIONAL TECHNOLOGY

There are certain concepts to be kept in mind while maintaining quality in evaluation of Educational Technology. They are: Utility, Feasibility, Propriety and Accuracy.

i) **Utility**: Evaluation should be useful to the affected persons viz., teachers, students and decision makers. This should be done on time. The results/value judgements should be clearly described.

ii) **Feasibility**: It should be practicable The evaluation procedures you intend to adopt must be practical from the point of view of your ability, vision as well as cost. This should not be too expensive.

iii) **Propriety**: All concerned with execution of Educational Technology should agree to go for evaluation. You must treat conflicts that arise in evaluation process openly and honestly. The strengths and weaknesses of project should be reported completely and fairly.

iv) **Accuracy**: The evaluation purpose should be clearly stated. Sources of data should be identified. Valid measures should be used for data collection. The tools should be reliable. Human error in data collection should be minimised. Analysis of data should be accurate and thorough. They should be followed by clear interpretations. The conclusions must be based on sound logic and appropriate data analysis.

14.4.2 STEPS INVOLVED IN EVALUATION OFEDUCATIONAL TECHNOLOGY

The steps of involved in evaluation of Educational Technology are presented the hereunder;

Step – 1 Objectives of Evaluation of Educational Technology

While conducting evaluation studies you must be clear about the purpose of evaluation. In other words, you must be clear about the expected outcomes of the evaluation study. For example, if you are interested in judging the effectiveness of the computer assisted method, you have to state it at the beginning stage of evaluation.

Step – 2 Specification of Criteria of Evaluation

In the context of judgement oriented evaluation, it is necessary to state the criteria against which effectiveness can be measured. There can be several criteria viz.;

a) Expected Achievement of Learners,: At the end of the programme; gain of post programme achievement over pre-programme achievement; comparison of achievement of the group exposed to Educational Technology with that of group not exposed to Educational Technology, etc,

b) Attitude of Learners: For instance, we want to develop certain attitude of learners through the use of Educational Technology in instructional system. Whether such attitude has been developed or not as an outcome of Educational Technology can indicate its effectiveness.

c) Positive Reaction of Users: Positive reaction of learners, teachers, parents, experts about the use of Educational Technology can indicate success of Educational Technology.

d) Cost Effectiveness: Whether within the stipulated time frame the Educational Technology has been used with lesser cost in comparison to others. Educational Technology can indicate efficiency of Educational Technology. Educational Technology may achieve the goals.

Step – 3 List of Data to be Gathered

It is important to list down the kinds of information to be gathered for evaluation in the context of a specific objective.

Step - 4 Identification of Tools

We have to identify different kinds of tools to data collection suited to the requirement of our objectives. Different tools like Achievement tests, Attitude scale, Reaction scale, Questionnaires, Interview schedule, and Proforma are used for evaluation.

Step – 5 Data Collection

Data collection may be linked with the process of the use of Educational Technology or it may be done at the end of the project. It

depends on the type of evaluation i.e., process based or product based study.

Step – 6 Analysis and Interpretation of Data

Appropriate procedures like descriptive statistical techniques, percentages and graphics are used for the analysis of data. In case of other specific designs other selected statistics can be used for the analysis of data.

Step – 7 Reporting

The last step is 'Reporting', in which the evaluation study should be reported systematically to come to a conclusion

14.4.3 DIFFERENT CONTEXT OF EVALUATION OF EDUCATIONAL TECHNOLOGY

There are three different contexts of Evaluation of ET is discussed in this sub section.

Context No.1 Teacher Develops the Technology

Teacher can develop instructional strategy, where he/she develops different materials, media based programmes and activities. In the process of development of different kinds of study materials and audio-video programmes, he/she adopts certain measures for their evaluation. While materials are put into operation evaluation may be conducted. After the completion of the programme, the output may be evaluated.

Context No.2 Teacher Adopts available Technology

Another context of evaluation is done when the teacher adopts available technology in teaching-learning situation and evaluates its effectiveness against pre-specified criteria.

For example, Media and materials developed by various distance education institutions may be used as inputs of teaching strategies at school level. You may like to evaluate the strategy during the process of operation of strategy and at the end of the operation of strategy.

Context No.3 Teacher utilizes media based programmes which are already in operation.

The third context of evaluation as mentioned above is related to evaluation of Media based programmes like ETV, School broadcast programmes which are already in operation. The teacher does not intervene with the programme strategy. He/she may be interested to evaluate the utility of such programmes, its usability, problems in operation of programmes, user friendliness, quality of different components of programme, etc. It is possible to the study reactions of

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participants, their opinion about the programme, their observations etc. as indicator of success of programme.

14.5 CONCEPT OF MANAGEMENT IN THE CONTEXT OF ET

Management means systematic utilisation of available resources for attainment of goals or the effective realisation of results. Management is defined as the "process by which co-operative group directs actions towards common goals". It denotes to function i.e., different steps involved in carrying out activities for effective goal achievement as well as the 'people' who discharge it. As managers, teachers have to play a significant role in decision-making and execution of teaching/learning programmes. This is a commonly agreed view that educational management means making use of available resources effectively and efficiently in achievement of goals of education.

Check Your Progress

Notes: a) Write your answer in the space given below:
b) Compare your answer with the one given at the end of the unit.

Fill in the Blanks :

1. Evaluation of educational technology -------------- the worth of educational technology.
2. -------------------------- is an aspect of evaluation of educational technology.

True or False:

3. Process evaluation indicates whether programme implementation follows appropriate from them.
4. Summative evaluation sums up the lessons taught.

Objective:
System approach incorporates

5. Analysis designing and Exciting in effective management
a) classifying b) assimilating c) executing
6. .... is a major component of junction of management in the context of ET
a) Directing b) suckering c) Instructing
7. ………………indicates the strengths and weaknesses of educational technology.
8. …………….. proposes that the evolution should not be conducted against the pre-determined goals

14.6 FUNCTIONS OF MANAGEMENT IN THE CONTEXT OF EDUCATIONAL TECHNOLOGY

Notes

The management experts emphasize on five major functions of management viz.:

1. Planning 4. Directing

2.Organising 5. Controlling

3. Staffing

Planning ET means taking decisions in advance of what is to be done, how and when it is to be done in the context of achievement of pre-specified goals and objectives. It involves futuristic exercises of exploring future needs and requirements and identification of future course of action in the context of present resources and required resources. Planning bridges the gap between present and future.

Organising ET means 'orderly’ assemblage of humans and materials. Moreover, it focuses on systematic linkage of formally identified and distinguished tasks, roles to be performed by different persons concerning execution of ET. The organization of ET involves the following steps:

a. Determination of activities concerning ET keeping in view its objectives.

b. Classification of activities into different clusters.

c. Classification of different groups of activities related to ET for different people.

d. Delegation of authority and fixing of responsibility for carrying out the assigned duties.

e. Co-ordination of different activities related to ET.

Staffing in the context of ET means recruitment of qualified personnel to man the activities concerning ET. It also means making proper arrangements for professional growth of human potential so that they can upgrade their knowledge and skills and develop a positive attitude towards changing roles in the context of new technology. It involves adequate manpower planning and introduction of different training and appraisal schemes for staff development to deal with ET.

Direction in the context of ET will mean facilities for suitable communication mechanism so that different sub components interact with each other properly. Appropriate communication will form a base for proper understanding among different units. Each and every functional unit must be aware of its respective roles and functions in the context of attainment of goals for the whole system. Motivating the

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functionaries and giving reinforcement in the context of operation is also a significant task in this direction.

Controlling in the context of ET means constant monitoring of actual performance of different components of ET from time to time. There is a need for monitoring to strengthen the base for decision-making. Furthermore evaluation of performance of different components will provide feedbacks for further improvement of ET and adoption of new strategies for the effective implementation of ET.

14.7 SYSTEMS APPROACH

The systems approach aims at solving problems through scientific approach involving 'effective' and 'efficient' strategies. In the context of ET "effectiveness" means the degree to which the actual output corresponds to the pre-specific objectives of ET. In other words, there must be pre-specified objectives of ET which is to be implemented through scientific means. The degree of matching of real outcome with expected outcome will indicate the measure of the degree of success of the strategy.

Furthermore, 'efficiency' indicates the potentials of an approach in terms of time and energy invested in comparison to those of other approaches; this must be seen as optimum output which emerges through adoption of efficient means. A systematic application of systems approach to Management of Educational Technology facilitates the functioning of management to be more effective and efficient.

From a systems approach, teaching with technology involves four major components: the students, the instructor, course content, and technology tools (See Figure no 10.1). An examination of each component raises a set of issues that we need to consider in order to make technology integration as successful as possible. For example, content can be examined in terms of learning outcomes and the discipline being taught. Instructors can think of their own experience with technology, the amount of time they have for planning and teaching, and their view of their role in the teaching and learning process. We need to think carefully about our students, their exposure and access to technology as well as their preferred learning styles. Finally, we can turn to the technology itself and analyze it according to its functions.

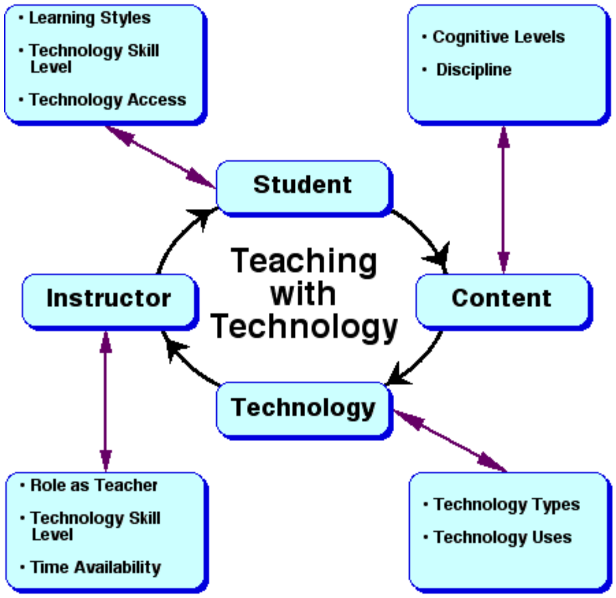


Figure No 14.1 Systems Approach perspectives of components of teaching with technology

System Approach as applied to Instruction is a "rational problem solving method of analyzing the educational process taken as a whole, incorporating all of its parts and aspects, including the students and teachers, the curriculum content, the instructional material, the instructional strategy, the physical environment and the evaluation of the instructional objectives".

Components of the instructional system are:

- Instructional objectives
- Pupil
- Teachers
- Contents
- Learning conditions
- Instructional strategy
- Evaluation (Summative and formative)

Advantages of System Approach

The advantages of system approach are furnished here under;

- System approach provides a framework on which the plans for implementing changes in education can be built
- It assist in identifying the suitability or otherwise of the resource material to achieve the specific goal

- It helps in assessing the resource needs, their sources and facilities in relation to quantities, time and other factors
- It assists in making use of technological advance to provide integration of machines, media and people for attaining the defined goals
- It permits an orderly introduction of components required to be demonstrated for system's success in terms of student learning.

Role of the Teacher in the System Approach

Various roles of the teachers in the system approach are presented below;

- Thoroughly assess the input of the system
- Gather as much data as possible about the subject matter
- Think of alternative processes for achieving his objectives
- Analyses his objectives into a well-defined learning task
- Make discussions regarding processes and components based on the best means of furthering the purposes
- Activates the system by putting the plan to action
- Gather feedback data accordingly and systematically
- Modifies the system's component and processes based on the feedback
- Assesses the effectiveness of the system by comparing the output with the inputs
- Modifies the system based on all resources of feedback.

Check Your Progress

True or False:

9. Humanistic approach to evaluation acmes at illuminating elision makers about the process of implementation of a perfect.

10. Formative evaluation means evaluation of performances of educational technology at the beginning of teaching.

Objective:

11. System analysis concerned with analysis of
    a) Target population b) contest
    c) Output or learning experience
12. System design is the …….step in system analysis
    a) First b) Second c) Final

14.8 STEPS IN SYSTEM APPROACH IN EDUCATIONAL TECHNOLOGY

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Systems approach includes three steps which can be adopted in the effective management of ET such as:

1. Analysis of Objectives
2. Analysis of System design
3. Analysis of system execution

1. Analysis of Objectives

It deals with proper identification of objectives. In other words, we will have to specify what are the expected outcomes of adopting ET at the school stage, and how it can be implemented to get the expected results.

The objectives must emerge from the needs of learners, teaching-learning system and the institution. Moreover, objectives must be situation/context specific. Hence, we will have to proceed on with analysis of the following:

a. Analysis of target population and their background.
b. Analysis of situation; school system, physical conditions, external systems support.
c. Analysis of needs and problems with future perspectives.
d. Analysis of aims and objectives.

a) **Analysis of Target Population**: We have to analyse the nature and characteristics of target population. For example, in the context of adopting Educational Television based teaching/ learning activities at the primary stage, we must explore who all will be the beneficiaries of such activities. Analysis of different background factors like demography, mother tongue, dialect, family background, parental involvement in the studies of children; technology acquaintance of learners, availability of necessary physical facilities for homework and interest of learners to learn through alternative channels can contribute a lot to identify the level of homogeneity in target population.

b) **Analysis of Situation/Context:** It refers to analysis of situations or contexts where the ET is intended to be put into operation, the internal and external environment of school system

c) **Analysis of Needs and Problems**: As already mentioned, the objectives must be based on analysis of needs from different sources viz., users needs, extra-curricular needs and institutional needs.

Analysis of needs from different sources should focus on specific ET activities intended to be incorporated as a school system.

Need refers to the gap existing between what exists and what we wish to be. To identify such gaps or needs we can apply different techniques like: interviews, opinion survey, observation of situations, job analysis etc. Need analysis may not focus on analysis of present need only. Planning will be more effective if need analysis focuses on futuristic needs. It means exploring needs for the use of ET keeping in view future learners, future curriculum and future school system.

d) **Identification of Aims and Objectives**: The analysis of needs from divergent angles on ET will help us to visualise a sound framework of outcome of a scheme involving ET.

They can be stated explicitly in general as well as specific forms. For example, the general aim of School Educational Television programme may aim at:

- enabling viewers to improve the level of achievement in school subjects, pertaining to the calibre of students;
- enabling viewers to broaden general knowledge;
- enabling viewers to develop social sensitivity;
- enabling viewers to develop future awareness.

These aims are to be specific in nature so that they can be operationalised. We call them as enabling objectives which exemplify different activities to be performed with a view to indicating the achievement of an objective. The enabling objective indicates the detailed operational component linked with each objective.

2. **Analysis of System design**

Once the needs are analysed, goals and objectives are specified and criterion measures are developed on ET, it is essential to move towards the second step of systems approach i.e., systems design. Systems design deals with the question of how the goals and objectives are to be accomplished. In other words, the design part deals with identification of different components of a system leading towards the achievement of its objectives.

The structure will have to be identified with regard to input process, output and feedback mechanism. We must decide how different components will be linked with each other. Let us start with the consideration of inputs with regard to management of ET. Input will be decided in the context of executed outcome as well as resources constraints. Analysis of existing physical conditions and resources (materials) and manpower will form the major task on input finalisation. For example, in the context of ETV project, the pioneering institution will have to analyse existing physical facilities and technology for production of ETV programmes and delivery of ETV programmes. The analysis of studio facilities, existing technology used

for production of video cassette based educational programmes, facilities for telecast of programmes and facilities at user school level will be very much essential. Moreover, existing facilities of human power support for development of software, production of video cassette programmes, dissemination and utilisation level will have to be situated in detail. The study of existing facilities in the context of expected outcomes is to be done in view of identifying the gaps between which inputs exist and which are expected.

Suppose, another teacher wants to use OHP during delivery of a lesson to his/her students, for this, he must ensure that materials required for OHP use are available with him/her. Materials like transparency sheets, OHP permanent marker pen, OHP itself, OHP screen, electric power point must be available before OHP is used for classroom teaching.

3. Analysis of system execution

This section deals with the functional part of the management. The input measures are taken into consideration. Necessary appraisal is done regarding different contextual variables and input variables. Criterion measures are developed. The means, methods and materials are identified. Media based softwares packages are developed. The audio-video packages are produced. Their operational details are worked out. Hence, all the necessary details chalked out at the programme design stage are set for operation. Many a times before final try-out of ET pilot try-outs are made in sample situations. Necessary modifications are made in the design on the basis of feedback from pilot try-out (Test trial).

While the ET programme is in operation we have to monitor the following:

- Integration of different components of the programme on day-to-day basis;
- Involvement of different agencies at operational stage;
- Different skills involved at transaction level;
- Participation of teachers, pupils and other concerned components.

In the context of operation of ET you will have to be vigilant about co-ordination of different components like: (1) media facility, (2) time schedule, (3) physical support including power supply, (4) working condition of gadgets, (5) communication facility, (6) teachers and learners preparatory tasks, (7) activities taking place during teaching-learning sessions etc. Proper monitoring tools must be adopted to record such co-ordination and identify the limitations if existing in any of the components.

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14.9 EVALUATION

1. What are the different areas of operation of ET which need monitoring?

2. What kind of evaluation strengthens the base of Management of ET?

14.10 LET US SUM UP

In this unit, you have been exposed to different functions of Management in the context of ET. Detailed description has been made about the steps of systems approach in Management of ET viz., analysis of needs and objectives; designing the system i.e., to design how the objectives will be accomplished and operationalising the system. Different steps of Management of ET involve a number of activities which can be shared by programme planners; institutional heads, teachers, students and others. This exposure may help you to manage ET activities at your institutional level smoothly.

14.11 UNIT-END ACTIVITY

What features will you evaluate in preparing a programme in T.V. media?

14.12 POINT FOR DISCUSSION

Identify the context for using different types of evaluation

14.13 ANSWERS TO CHECK YOUR PROGRESS

Answers :

1. Judges
2. Improvement
3. True
4. False
5. Executing
6. Directing
7. Product Evaluation
8. Goal Free Evaluations
9. True
10. False
11. A
12. B

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14.14 SUGGESTED READINGS/REFERENCES

- Agarwal, J.C. : Educational Technology and Management, Agra : Vinod Pustak Mandir. 2003.
- Agarwal, Rashmi : Educational Technology and Conceptual Understanding , New Delhi : Prabhat Prakashan, 2001
- Brown, J.W., R.B. and Hercheroad :A.V. Instruction Technology Media and Method. New York : McGraw Hill Book Company, 1977.
- IGNOU, Educational Technology, B.Ed Study Material, New Delhi.

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MODEL QUESTION PAPER
B.Ed., II YEAR
EDUCATIONAL TECHNOLOGY

Time: 3 Hours **Marks: 75**

PART – A

I. Write all the questions.10 x 2=20

1. Give an appropriate definition for educational Technology?
2. What are the variables of Teaching?
3. What do you mean by system approach?
4. Mention the salient features of Mass Media?
5. What are the advantages of E- Learning?
6. What multimedia will you choose to teach science
7. Briefly point out the limitations of CAI?
8. How will you provide learning experiences to the learners at school level?
9. Mention the merits of lecture method in teaching?
10. What is Meta cognition?

Section –II

Answer any five Questions 5x5=25

11. Mention the scope of Educational Technology
12. What is the relationship between teaching and learning process?
13. What are the advantages of system approach?
14. Amplify the uses of Education Television.
15. What is cybernetics?
16. Describe factors affecting media selection
17. What are different modes of CAL
18. How will you evaluate the teaching technology Materials

Section –C

III. Answer the following (Internal Choice). 2x15=30

1. a)With a suitable example explains the steps involved in system approach

   (or)

b) Which 'teacher determined Teaching technique' do you consider as important in imparting Knowledge? Explain with illustrations.

2. a) Define Mass-Media. Explain the various roles of Mass-Media, What are the advantages of Mass-media?

(or)

b) What is Learning Styles? Explain various types of learning styles with relevant Examples.

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